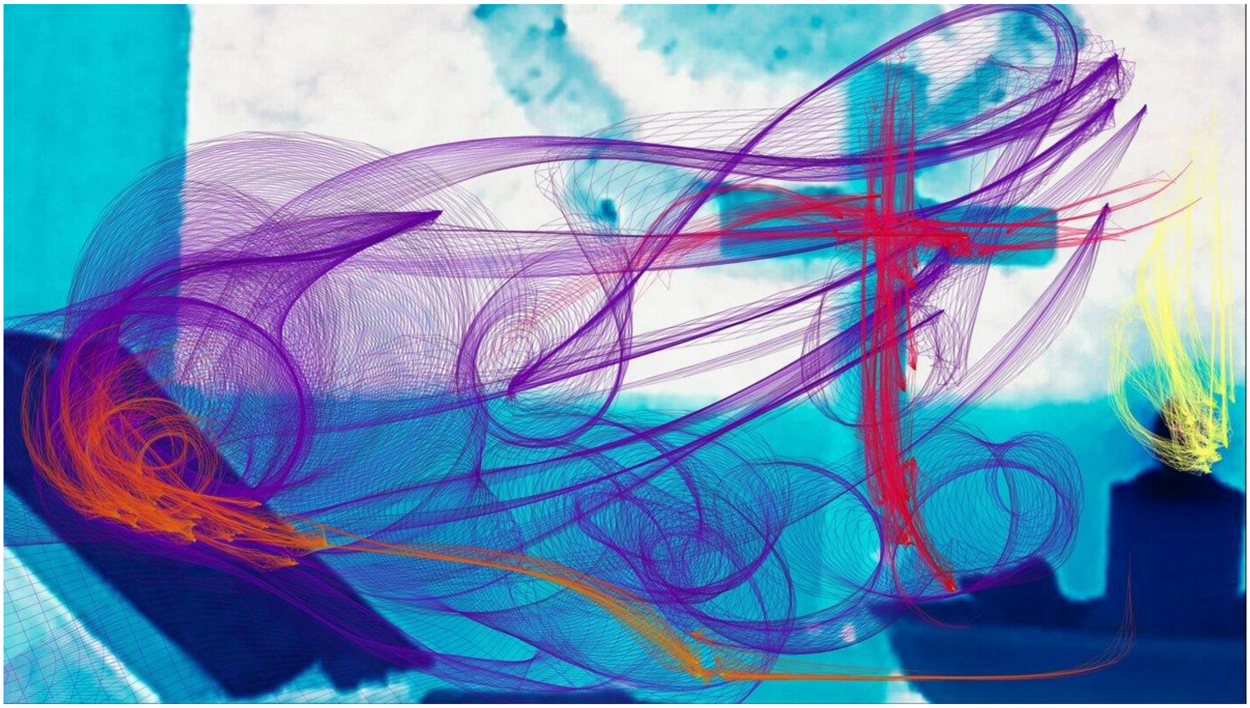

Let The Wind Blows

PHYSICS OF WAVE AND ONLY WAVE

Victor Christianto | Florentin Smarandache | January 10, 2018
Published by **The Second Coming Institute**, www.sci4God.com

Persembahan

Buku ini dipersembahkan kepada:

1. Yesus Kristus, Juruselamatku, Sang Sahabat Sejati dan Gembala yang Terbaik,

2. Saudara-saudari dan kerabat saya yang terkasih di berbagai kota,

3. Umat Kristen yang merindukan turunnya hujan akhir sesuai dengan nubuat Nabi Yoel,

4. Semua umat yang menanti-nantikan kedatangan Sang Mesias kedua kalinya

5. Seorang sahabatku di kota B

“Angin bertiup ke mana ia mau, dan engkau mendengar bunyinya,

Tetapi engkau tidak tahu dari mana ia datang atau ke mana ia pergi.

Demikianlah halnya dengan tiap-tiap orang yang lahir dari Roh.” (Yoh. 3:8)

***

“The wind blows wherever it pleases.

You hear its sound,

But you cannot tell where it comes or where it is going.

So it is everyone born of the Spirit.” (John 3:8, NIV)

Book Title: Let the Wind blows, Physics of Wave and Only Wave

@Victor Christianto & Florentin Smarandache, January 2018

Published by:

The Second Coming Institute

www.sci4God.com

Cover image source: https://christianitymatters.com/2015/08/14/who-is-and-what-are-the-works-of-the-holy-spirit/

Prelude

This book is a compilation of some rather old papers and some new papers, by myself and also Prof. Florentin Smarandache.[1] In some papers, we also join working with other colleagues, e.g. Dr. Volodymyr Krasnoholovets from IOP Ukraine, and Dr. Yunita Umniyati.

This compilation is inspired from a series of prophetic seminars by Rev. Jan Friso from Kingdom Impact[2], and also a discussion with Minister Dr. Robby Chandra.

All in all, we are also grateful to a number of colleagues, including Prof. Thee Houw Liong, Prof. Liek Wilardjo, Prof. Atmonobudi Soebagyo, Dr. David Widihandojo, Sujarwo Silas & Linda, Dr. Wonsuk Ma, Minister Gatut Budiyono, Minister Gani Wiyono, Dr. Yonky Karman, Dr. Joas Adiprasetya, Dr. Paskalis Edwin Nyoman Paska, Minister Yulia Oeniyati, Prof. Akira Kanda, Dr. Carmen Wrede, Mrs. Hiroko Morioka, Prof. Jose Carlos Tiago Oliveira and Prof. Gusto Gadama, and many others, who often encouraged and reminded us to keep on being faithful Christians in this darkness time.

As a last note, we also thank to Holy Spirit who always guide us in our way, especially whenever we were lost of our path to find the truth. That is why this book with title: *Let The Wind blows* is dedicated to Holy Spirit. Let us pray that the Holy Spirit will be poured once again in our time, as prophesied by Joel:

And it shall come to pass afterward, that I will pour out my spirit on all flesh; and your sons and your daughters shall prophesy, your old men shall dream dreams, your young men shall see visions. (Joel 2:28)[3]

Epiphany week, Mid January 2018

Version 1.0: 10th January 2018

VC & FS

[11] http://fs.gallup.unm.edu/

[2] http://www.kingdomimpact.nl

[3] http://biblehub.com/commentaries/joel/2-28.htm

Contents

On preparation for the Second Coming of Jesus Christ

By Victor Christianto, Second Coming Institute, URL: www.sci4God.com

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What God promised to tell me to do as the Elijah for the End of Times.

*And now He fulfill His promise, because this is the end of Times.

Note: Believe it or not, this article was written very carefully under guidance of Holy Spirit, because I do not know the meaning and unprepared to become a prophet of God. But thanks God, He is full of mercy.

Beginning

God call me in Oct. 2009 as His prophet in order to prepare so many people in His body of churches and nations for the End of Times. Before that, God asked me three times: "Do you love Me? Then shepherd My lambs." And I replied, "Yes, God. You know that I love You." At the time, I remembered that classic conversation between Jesus and Peter in John chapter 21. I tried to see how the relation of Jesus's question to Peter and God's question to me, but it is mystery.

Initially, I was so enthusiastic with this unexpected job from God to become His prophet, and at the time, a part of me said that it is a very rare job offer.

Why? Because I have not been before being an employee at governor office, or president office, then suddenly God offered me a coolest job possible: to be His prophet to prepare many chruches in the world for the Second Coming of Jesus Christ. Who will not be moved by God when He come and touch you? Just quickly recalled a few of them who were so moved by God the Most High as recorded in the Holy Bible: Enoch, Noah, Abraham, Moses, Gideon, Samuel, David, Elijah, Elisa, Daniel, Ezekiel, Jeremy, Isaiah and also Mary, Elizabeth, Peter and other first disciples, and Paul and then many people of God since then.

Like believers of Azusa Street Movement in California around 1906-1908, who were so filled with Holy Spirit, then they decided to buy one way ticket to go to so many different countries. They did not have any mission body backup or any foreign language preparation to go to other nations, but they did it because they were so moved by God.

So did I, without a plan at all, I decided to stop from my work, and moved to my parents' hometown in East Java, Indonesia, because God told me to serve back in my local church where I grew up with since my childhood.

I was not prepared at all to do such an immense task of being His prophet to reach so many people from all nations in the world. But I just believed that God will prepare me to fulfill His calling.

Frustration

Each day between 2009-2011 God help me to write many pastoral letters. Then I tried to send those letters to some institutions and international newspapers via emails. Numerous emails were sent. But all were rejected, probably that nobody care about preparing for the End of Times.

As a result of that failure, in the beginning of 2011, I felt some kind of frustration of my situation. Therefore, I stopped my morning activities like writing letters.

That was my mistake: "frustrated."

God prepared me

Then I began to take a post-graduate theology education in my hometown.

Along my study of theology, God teach me so many things through all lecturers and also friends whom I met during classes.

He prepared me for doing an impossible job as His prophet.

Thanks God for helping me to complete this theology study.

Distractions

After graduation day, I began to look for new jobs. But my effort to get a descent ministry job, failed miserably. I did not know exactly what should I do?

This was when I became gradually follow too many distractions. I worked on other things without seeking God's face in my life.

That is why I lose focus on how to fulfill my task as His prophet in the End of Times.

That was my mistake: "distracted."

How I fall again

After loosing focus on God's calling to become His prophet, I became so distracted and getting more distracted. I did not spend one hour in each morning to sit in the feet of Jesus to listen to Him anymore. I became totally forgot my calling as God's servant to prepare His churches for the Second Coming of Jesus Christ which is very near.

Then I fall again into my old habits such as spending too much time for leisures etc.

Practically, I leave behind God's way of living. I was totally lost, but I felt that I was doing fine. I did not know that I have made terrible mistakes to God the Most High.

God saved me again

Then, suddenly in one morning last week (16/10/2017), I woke up and felt very weak. I cannot eat and almost cannot walk, and I did not know what was wrong. But deep inside my heart, I realized that there should be a reason for this illness.

It was really painful, and at a point I felt that I was going to die. But God spoke to me: "Do not worry, you will not die. You will live."

Thanks God, after two days I can walk and then meet a doctor, then she gave me a prescription. Then after taking pills of that prescription, gradually I got back healthiness and getting into recovery.

In Friday morning (20/10/2017), I can eat a plate of hot rice again. I felt so happy and relieved.

God renew His calling to me

In Saturday morning (21/10/2017), I felt much better and fully recovered from illnesses.
Around afternoon, suddenly Holy Spirit spoke to me very fast, continuously, just like a flood. I realized that I have made terrible mistakes to God.
In essence, God is very angry at me. Yes, He love me but He is very disappointed because I almost did not do anything properly during the last 8 years since 2009 to prepare His churches all around the world for His Second Coming, which is going to take place very soon.
I realized that I was frustrated, then distracted, then became completely lost of His way.
I was so blind then I have failed Him again.
But praise God, He is very full of mercy and forgiveness. God forgive my mistakes and stupidity, then He renew His calling to me to become His prophet for the End of Times.
Now, I am completely born-again. (Read the Gospel of John, chapter 3).
And now I am fully committed to not fail Him again. I decided to focus and follow Him only. I will devote my rest of life to listen to God each minute, each hour, day by day.
I know that God want me to grow up in inner spirituality and getting mature in spirit, and become a child of God. God promise to guide me, teach me, and lead me minute by minute, so I can fulfill my calling as His prophet in the End of Times.

That is a story of a totally useless servant.

"So likewise ye, when ye shall have done all those things which are commanded you, say, We are unprofitable servants: we have done that which was our duty to do."
(Read Luke 17:10.)

Conclusion
I was appointed to become God's prophet in 2009, but I got frustrated, distracted, go astray, then totally was lost and fall again. I did not do my calling properly as a prophet of God the Most High.
But thanks God, He is very kind and full of mercy to a wreck like me. He renew His calling then offer me a second chance to be His prophet.
Now I am bornagain, completely new, and fully committed and dedicated to fulfill my calling as His prophet in order to prepare His churches in all nations and tribes in this World for the Second Coming of Jesus Christ.
Thanks to God the Almighty, for giving me this second chance to become His prophet.
I will not fail Him again. God help me and guide me to fulfill this immense task.

Amen.

Monday night, 23 October 2017, pk. 23:36

from a useless servant of God,
Victor Christianto

----

*Urgent Message from God the Most High for all nations and tribes:

"This is the message from God the Most High, who reign from eternity to eternity:

God the Most High is very angry to the entire world. Yes, all of you, all people from all nations and all tribes, including all governments both small and large. I, God the Most High, created and own all living beings in earth, all entities and objects in earth, all water and land and oxygen and sky, including all of you human beings, both live and dead.
Deep in your heart, all you know that you should worship God the Most High, with all your heart, all your sould, all your mind.

"Jesus said unto him, Thou shalt love the Lord thy God with all thy heart, and with all thy soul, and with all thy mind."
(Matthew 22:37).

But all of you do not live properly with full respect and fear to God the Most High.
After waiting for all of you since long time, now I decided to end it all very soon. All people from all nations and all ethnics and all languages should know very well that the End of Times is very near.
The Wrath of God is coming very soon to your world. Therefore, all of you should prepare for these Wrath. Only few will be saved.
The Age of Gracefullness was over, now begins the Age of Repentance. Therefore, all of you should repent, pray, fast properly, turn back from all your evil ways, then come to Me, God the Most High, as quick as you can.

Return to God, o all corners of the world. Period."

Note: All children and servants of God the Most High who have heard this message from Me, God the Most High, have obligation to translate it to as many foreign languages as possible, then copy it as multiple times possible, then distribute this message to as many people with all accessible languages as possible, with all forms of telecommunication and information devices that are available to you (telex, facsimile, cellular phone, smart phone, tablet, radio, television channels, email, twitter, instagram, and many others), as quickly as you can: to all your family and wifes/husbands and children, to all your relatives, to your office friends, to municipal employees in your towns, to your government officers, to your presidents or kings or queens, to all police officers, to all military officers, to people in villages in remote areas near your town, to all native tribes in remote areas and high mountains. All people from all nations and all ethnics and all languages should know very well that the End of Times is very near.

Added little note: Why me?

To all readers who are still asking questions like: Who are you? And Why are you chosen to become a prophet of God?

A simple answer is that : me do not know, either.
But allow me to tell you a little background of me, just as per necessary.
I was just an ordinary boy. I was born in a small town, around 1969.
Then I took back school, and when I was young boy, I liked to sing in a church choir, and school choir. Nothing really special in this period, except that one morning when I was 9 or 10, my father gave us a challenge: whoever can complete reading the Bible book thoroughly from Genesis to Revelation within one year, then he will give a gift.
At the time, I was quite motivated, therefore since then I spent each night to read the Bible competely. I started with Genesis, and moved one chapter by one chapter, until I finished in around a year with the book of Revelation.
Then I talked to my father that I just completed the Bible in one year as he requested. But my father has completely forgotten his challenge one year before, and he did not say anything to me regarding this.
But it was okay for me, then I moved on with my life.
Then I took junior high school (1981-1984) and senior high school (1984-1987) in the same local hometown.
Again, i was ordinary boy, nothing special in this period, except at age around 17, somehow I became more interested in religious matters. I started to attend night class sessions in church. The classes were about how to do evangelism properly. I attended that classes each week regularly, then gradually I decided to take more time in private bible study. I started to study the Bible, and put notes on each chapter that I was studying. The notes began very simple, then gradually these notes become more and more lengthy. I was more and more absorbed in this activity, until I almost forgot to do daily tasks like attending classes, etc.
At a point, I realised that I cannot complete this immense task of writing Bible commentary of the whole Bible. Then I stopped it.
Then I started to realise that my college study was at the brink of failure, so I decided to catch up, and focus on my study until my scores were getting improved, and finally I completed bachelor in technical study in September, 1992.
Afterward, I went to Jakarta to start work as a civil engineer. That was the beginning of my career as engineer.
I can continue this story, but you will find it very boredom. So I must stop it here.

As conclusion, God is very good to me, and He really took care of me. He is the Good Shepherd. I shall not want. Read Psalm 23.

The story above was actual short biography of me
This article was written under special guidance of Holy Spirit

23 October 2017, pk. 23:02

From a useless servant of God,
Victor Christianto

The Twelve Commandments:

An extension of Szilard's Ten Commandments

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Abstract

In their pursuit of new theories, physicists often need a guideline like a lamp shedding light on their way. Such a guideline has been proposed by renowned Hungarian physicist Szilard, called "*Szilard's 10 commandments*." Here we add two more additional commandments, in the light of new critics to string theory and its variations like superstring and M-theory.

Introduction

There are numerous versions of the legend of the Commandments that God gave to Moses. A humorous version of this legend told that actually God came to Italian people first, and He asked: "Would you accept My commandments?" "Like what?" they asked Him. God answered them: "Like: Thou shall *not* kill." "Oh, no. Thank You, God. We cannot accept Your Commandment. We are Italian, and many of us are mafia here, then we often kill each other." Then God came to French people, then He asked the same question: "Would you accept My commandments?" "Like what?" they asked Him. God answered them: "Like: Thou shall *not* commit adultery." "Oh, no. Thank You, God. We cannot accept Your Commandment. We are French, and many of us here like to do adultery." Then God came to Israeli people, then He asked the same question: "Would you accept My commandments?" They asked Him: "How much is it?" God replied: "All are free." Then they replied: "All right then, please give us ten."

Another version of that legend told that there were originally more than the *Ten Commandments* that God gave to Moses. As Moses came down from Mount Sinai carrying the heavy stones upon which the words were written, some have said he stumbled and fell and the stones were smashed. Several of the tablets were broken beyond repair, and only ten of the commandments survived. The fragments of the missing and garbled commandments may have been rediscovered by a Hungarian, Jewish, atomic physicist named L. Szilard. [1]

They are called "*Szilard's 10 commandments.*" He wrote them in German with no thought, at the time, of publishing them. During Szilard's lifetime, he was never happy with the attempts to translate the commandments into English, so they were never published while he was alive. After his death in 1964, Jacob Bronowski wrote them down in English as a remembrance for some of Szilard's friends.[1]

Here we add 2 more additional commandments, in the light of new critics to string theory and its variations like superstring and M-theory. Such critics to string theory came mostly from mathematicians, such as Sir Roger Penrose and Peter Woyt.[2][3]

Now it seems worth to remind ourselves to a wisdom saying by Ronald Coase, a Nobel laureate in economics. He once remarked:[4]

"*if you torture data long enough, it will confess to anything.*"

For theoretical and mathematical physicists, data can be changed to be "geometry", because most of them like geometry (especially supradimensionality in string theory, cf. Penrose).

Therefore if we condense those criticism into one line, it would be as follows:

"*if you torture geometry long enough, Nature will confess to anything.*"

Therefore, our proposed 11th commandment is:

- *Do not torture geometry, try to respect and learn from Nature.*

As with the 12th commandment: we would like to add a rule that a scientist should not make a pact with Satan. This one refers to the so-called *Faustian bargain* in nuclear energy, which term has been advocated by the late Alvin Weinberg.[5]

Below is the complete list of Szilard's 10 commandments with our additional 11th and 12th commandments.

The 12 Commandments for Physicists

1. Recognize the relationships between things and the laws which govern men's actions, so that you know what you are doing.

2. Direct your deeds to a worthy goal, but do not ask if they will achieve the goal; let them be models and examples rather than means to an end.

3. Speak to all others as you do to yourself, without regard to the effect you make, so that you do not expel them from your world and in your isolation lose sight of the meaning of life and the perfection of the creation.

4. Do not destroy what you cannot create.

5. Touch no dish unless you are hungry. (A pun that could read: Do not turn to the court of law unless you are hungry).

6. Do not desire what you cannot have.

7. Do not lie without need.

8. Honor children. Listen to their words with reverence and speak to them with endless love.

9. Do your work for six years; but in the seventh, go into solitude or among strangers, so that the memory of your friends does not prevent you from being what you have become.

10. Lead your life with a gentle hand and be ready to depart whenever you are called.

11. Do not torture geometry, try to respect and learn from Nature.

12. Do not make a pact with Satan. Fear of God should be the beginning of your knowledge.

Concluding remarks

We hope this short article may inspire younger generation of physicists and mathematicians to rethink and renew their approaches to Nature, and perhaps it may also help to generate new theories which will be useful for a better future of mankind.

Version 1.0: 28 November 2017, pk. 18:24

Version 1.1: 7 December 2017, pk. 20:14

Version 1.2: 10 December 2017, pk. 00:16

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References:

[1] Ray Cooper. Szilard's 10 commandments. url: https://unavistacircular.files.wordpress.com/2014/11/szilard_10commandments.pdf

[2] Sir Roger Penrose. *Fashion, Faith and Fantasy in the New Physics*. https://press.princeton.edu/titles/10664.html

[3] Peter Woyt. *Not Even Wrong*, ten years later: a view from mathematics on prospects for fundamental physics. February 3, 2016. http://*www.math.columbia.edu/~woit/rutgers.pdf*

[4] Ronald Coase's quote. https://www.goodreads.com/quotes/1249307-if-you-torture-the-data-long-enough-it-will-confess

[5] Alvin Weinberg's term of Faustian bargain. url: http://energypost.eu/nuclear-power-the-faustian-bargain/

Applications of Neutrosophic Membership Function in Describing Identity Dynamics in Missiology and Modern Day Ecclesiology

(An exploration in Mathematical Theology)

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Abstract

As Paul Hiebert called it in his paper: "*The flaws of excluded middle,"* people especially in Asia and Africa can adopt a "middle Earth" view, i.e. a world where both rationality and supra-rationality can co-exist. Such an "included middle" worldview can be viewed in terms of Neutrosophic Membership Function too. Similarly the dynamics of identity change between outer faiths and Christianity is often a long and complex process, and we submit that it can be modelled as a spectrum, of which some people described the process as C1-C6. This spectrum can be viewed in terms of Neutrosophic Membership function. In this paper, we offer a fresh look at these problem using two new concepts: Liquid church and also Neutrosophic Membership function. It is our hope that our model, which may be called "*Neutrosophic Liquid Ecclesiology*," can shed some light on the interaction and dynamics in Missiology and modern day Ecclesiology, especially in Asia and Africa context. All in all, this paper may be considered as an exploration of a new subject in doing theology: *Mathematical Theology*.

Introduction: dynamics of Christian identity

The dynamics of identity between outer faiths to Christianity is often a long and complex process, and we submit that it can be modelled as a spectrum, of which some people described the process as C1-C6. This spectrum can be viewed in terms of Neutrosophic Membership function. Similarly, people especially in Asia and Africa can adopt a "middle Earth" view, i.e. a world where both rationality and supra-rationality can co-exist, as Paul Hiebert called it: "The flaws of excluded middle." Such an "included middle" worldview can be viewed in terms of Neutrosophic Membership Function too. In this paper, we offer a fresh look at these problem using two new concepts: Liquid church and also Neutrosophic Membership function.

In the first section, we will give a short review on the Liquid Church, then we will review Neutrosophic set and membership function. Thereafter we will discuss how we can see dynamics of Christian identity through these two concepts.

What is Liquid Church?

Ward draws upon the writing of Zygmunt Bauman who explores contemporary Western culture and who notes that modernity has produced institutional expressions of church that tend to be more solid and rigid. Ward also describes various mutations of solid church that he describes as heritage site, refuge, and nostalgic community.

So he refers to the present as 'liquid modernity'. The solid ice of modernity is melting away, resulting in some big ice chunks left floating about an increasingly fluid culture. It's a helpful metaphor that effectively frames his thoughts throughout the book.

Ward's recommendation is that the church must become liquid in order to reach a liquid culture. Solid church (aka, Church as we've always known it), centered on a weekly congregational gathering, is completely irrelevant to a liquid culture that no longer utilizes a regular, weekly, social gathering as its primary method of communication and community formation. Instead, liquid culture relies on networks, communication processes based on hubs (affinity-based gathering beyond a Sunday morning service) and connecting nodes (methods of communication/participation in the network).(2)

What is Neutrosophy?

Vern Poythress argues that sometimes we need a modification of basic philosophy of mathematics, in order to re-define the redeemed mathematics. See [10]. In this context, allow us to argue in favor of Neutrosophic logic as one basic postutale, in lieu of the Aristotle logic which creates many problems in real world.

In Neutrosophy, we can connect an idea with its opposite idea and with its neutral idea and get common parts, i.e. <A> /\ <nonA> = nonempty set. The common part of the uncommon things! It is true/real... paradox. From neutrosophy, all started: neutrosophic logic, neutrosophic set, neutrosophic probability, neutrosophic statistics, neutrosophic measure, neutrosophic physics, neutrosophic algebraic structures etc.

a. Neutrosophic view on dialectics can be summarized as follows:

It is true in restricted case, i.e. the Hegelian dialectics considers only the dynamics of opposites (<A> and <antiA>), but in our everyday life, not only the opposites interact, but the neutrals <neutA> between them too. For example: you fight with a man (so you both are the opposites). But neutral people around both of you (especially the police) interfere to reconcile both of you. Neutrosophy considers the dynamics of opposites and their neutrals.

So, neutrosophy means that: <A>, <antiA> (the opposite of <A>), and <neutA> (the neutrals between <A> and <antiA>) interact among themselves.

b. What is Neutrosophic membership function?

A neutrosophic set is characterized by a truth-membership function (T), an indeterminacy-membership function (I), and a falsity-membership function (F), where T, I, F are subsets of the unit interval [0, 1].

As particular cases we have: single-valued neutrosophic set {when T, I, F are crisp numbers in [0, 1]}, and interval-valued neutrosophic set {when T, I, F are intervals included in [0, 1]}.

Neutrosophic Set is a powerful structure in expressing indeterminate, vague, incomplete *and* inconsistent information. (3)

c. A lesson from Jerusalem Christianity in the First Century

It is known that the early churches especially the Jerusalem Christianity was not a monolithic congregation, instead it was composed on variety of groups: Pharisee Jews, Aramaic speaking Jews, Hellenistic Jews, and also the Gentiles. As the book of Acts told us, these groups were often in miscommunication among each others. This story can be inferred from Acts chapter 15, and also from the letter to Galatians. However, this group can also grow rapidly just because they maintain a Neutrosophic identity, or in Ward's term: Liquid ecclesiology.[1] If we are allowed to put this view on Early Church especially in Jerusalem Christianity, it is as follows:

[1]We thank to Dr. Robby Chandra for fruitful discussion on a liquid view of the Early Church. However such an assertion needs further study.

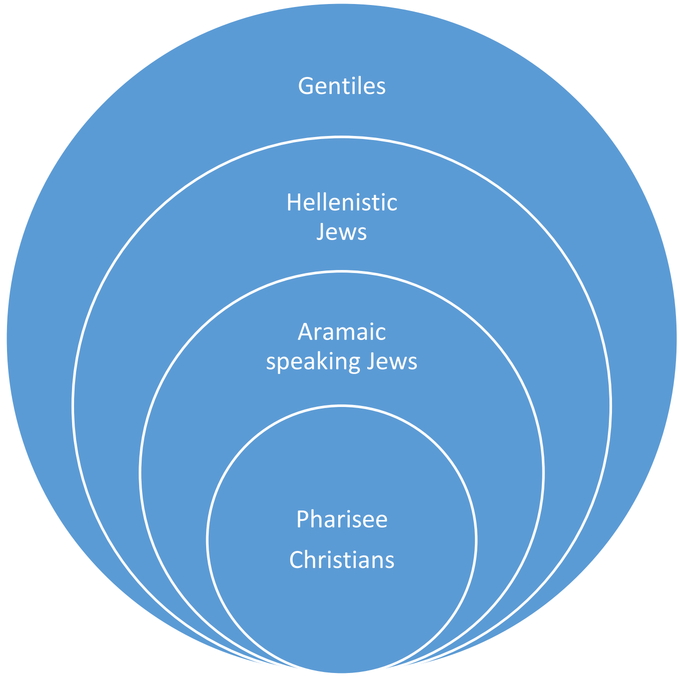

Diagram 1. The stacked diagram of Jerusalem Christianity, derived from the book of Acts

Liquid Church and Neutrosophic Membership Function's View on Dynamics of Christian Identity

According to Paul Hiebert, most people in Asia and Africa often adopt a view which accept both rationality and supra-rationality. Unfortunately, many Western-born missionaries only adopt a worldview that Christianity equals to rationality, period. As a result, Christian missionaries often oppose the mystical belief of people that they are ministering. Such a different worldview can result in many confusing problems in Missiology processes in Asia and Africa.

The integral view of humanity and spirituality, instead of two-tiered Western view of the world, appears to be more in line with majority of people in underdeveloping countries, especially in Asia and Africa. See for instance the work by Paul Hiebert [1].

Therefore we propose that such a flaw in excluded middle worldview (originated in Aristotelian logic) can be elevated if we adopt a new non-Aristotelian logic, which we call Neutrosophic logic, included with Neutrosophic Membership function. In other words, we should accept that in real world, most people accept that both rationality and supra-rationality co-exist. In other words, we are not just rational thinkers, as philosophers assumed.

In the same way, in doing Ecclesiology in this modern day Asia and Africa, we need to consider the complex identity possibilities, which can be adopted by people from outer faiths and Christianity. In other words, the distinction between those who are Christians and those who are not can be so blurred, as people can choose to be semi-Christian or half-Christian.

This process has been viewed by some studies in Missiology, as C1-C6 groups. In these groups, people feel happy because they are not pushed to become like Western churches, with Western way of life.

Therefore, we consider the following applications of Neutrosophic membership function Ecclesiology and Missiology: it is common to find that many Buddhist people are also observing Christian teaching, because they hear that Jesus's teaching may have similarity with Zen Buddhism. Or Hindu people may find similarity between Jesus and Khrisna, a mythic hero in Hindu mythology. Although Khrisna is mythical, this may be viewed as early step to become a real disciple of Jesus. This reality should be considered by anyone trying to build a mission ministry in Asia and Africa regions.

Concluding Remarks

As Paul Hiebert called it: “The flaws of excluded middle,” people especially in Asia and Africa can adopt a “middle Earth” view, i.e. a world where both rationality and supra-rationality can co-exist. Such an “included middle” worldview can be viewed in terms of Neutrosophic Membership Function. In this paper, we offer a fresh look at these problem using two new concepts: Liquid church and also Neutrosophic Membership function.

In the first section, we gave a short review on the Liquid Church, then we will review Neutrosophic set and membership function. Thereafter we discussed how we can see dynamics of Christian identity through these two concepts.

It is our hope that our model, which may be called “*Neutrosophic Liquid Ecclesiology*,” can shed some light on the interaction and dynamics in Missiology and modern day Ecclesiology, especially in Asia and Africa context. All in all, this paper may be considered as an exploration of a new subject in doing theology: *Mathematical Theology*.

Acknowledgement

This paper is dedicated to our Lord and the Good Shepherd, Jesus Christ, who has reminded us that to become the true disciples require a complex process and long journey. We are also indebted to Minister Dr. Robby Chandra who has shared with us the ebook by Pete Ward, *Liquid Church*, which has enlightened us on the complexity of Christian identity problem in modern day. Special thanks to an old friend, Buce Waelaruno and his daughter, Gaby Bernadette Waelaruno, who remind one of us to the importance of doing real mission, instead of just keeping the sheeps around us (i.e. aquarium way of doing ministry).

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References:

[1] Paul Hiebert. The Flaw of Excluded Middle. *Journal of Missiology*, 1982; [1a] Paul Hiebert. Transforming Worldviews. *Mission Focus, Annual Review*, 2002

[2] Peter Ward, Liquid Church. Ebook version. Eugene: Wipf & Stock Publ., 2013; and [2a] Book review. URL: https://layreadersbookreviews.wordpress.com/2015/05/29/liquid-church-pete-ward-2/

[3] Peter Ward. Liquid ecclesiology : the Gospel and the Church, Leiden; Boston: Brill, 2017.

[4] Jun Ye. Subtraction and Division Operations of Simplified Neutrosophic Sets. Information 2017, 8(2), 51. URL: http://www.mdpi.com:8080/2078-2489/8/2/51

[5] Florentin Smarandache, *Neutrosophy. Neutrosophic Probability, Set, and Logic*, ProQuest Information & Learning, Ann Arbor, Michigan, USA, 105 p., 1998; http://fs.gallup.unm.edu/eBook-neutrosophics6.pdf (edition online);

[6] Florentin Smarandache, *n-Valued Refined Neutrosophic Logic and Its Applications in Physics*, Progress in Physics, 143-146, Vol. 4, 2013; http://fs.gallup.unm.edu/n-ValuedNeutrosophicLogic-PiP.pdf

[7] F. Smarandache, *Neutrosophic Overset, Neutrosophic Underset, and Neutrosophic Offset. Similarly for Neutrosophic Over-/Under-/Off- Logic, Probability, and Statistics*, 168 p., Pons Editions, Brussels, Belgium, 2016, on Cornell University's website:
https://arxiv.org/ftp/arxiv/papers/1607/1607.00234.pdf
and in France at the international scientific database:
https://hal.archives-ouvertes.fr/hal-01340830

[8] Kees de Groot. The Church in Liquid Modernity. *International Journal for the Study of the Christian Church*, 2006; [8a] Kees de Groot. Three types of Liquid Religion. *Implicit Religion*, 2008.

[9] Manju Sharma. Paul Hiebert's Worldview model. *Himalayan Journal of Sociology & Antropology-Vol. V* (2012)

[10] Vern Poythress. *Redeeming Mathermatics: A God-centered approach.* Wheaton: Crossway, 2015.

Reinterpreting Tlön, Uqbar, Orbis Tertius: On the Antirealism Tendency in Modern Physics

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ABSTRACT

Borges has a rare ability to put wild ideas into detective stories with reporting style. At least that is the impression that we got on his short stories. In particular, one of his short story is worthnoting: *Tlon, Uqbar, Orbis Tertius*. The story told us about a mysterious country called Uqbar, in apparently an unofficial reprint of *Encyclopedia Britannica*. It also tells about Tlon, a mysterious planet, created purely by imaginative minds. While this story clearly criticizes Berkeley view and may be not related to our daily reality, a reinterpretation of this story leads us to a long standing discourse in the philosophy of science: to how extent the entire modern physics follow such a Berkeley-antirealism tendency? This paper is intended to bring this subject into our attention. We will also discuss shortly on the antirealism in certain trends in theoretical physics and cosmology.

Keywords: realism-antirealism discourse, modern physics, theoretical physics, modern cosmology

1. Introduction

Some years ago, one of these authors (VC) found a copy of collected works of Jorge Luis Borges. He found the book is quite strange compared to other fiction books. But only recently, he realizes that Borges may have some hidden messages to say to his readers. In particular in his short story: *Tlön, Uqbar, Orbis Tertius* [1], Borges was probably rather anxious on certain trends in modern science, i.e. that a bunch of academic luminaries may be trying to create a new world or planet out of pure fantasy. To quote his own sentence: *"the article said that the literature of Uqbar was a literature of fantasy, and that its epics and legends never referred to reality but rather to the two imaginary realms of Mlekhnas* *and Tlön."* [1, p. 37] Those people may push the imagination up to a point that they published: "*A first encyclopaedia of Tlön. Vol. XI. Hlaer to Jangr*." [1]. Tlön is an unknown planet, it was created out of pure fantasy. The planet has presupposed idealism, just like in Berkeley's philosophy.

The problem is what will happen if hard sciences such as particle physics, mathematical physics, astronomy, and cosmology also try to put Berkeley view seriously? To how extent we can mix up cold reality with pure fantasy?[1]

At first, we are not so sure about how extent the entire modern physics has been influenced by antirealism tendency. But, then we heard that Sir Roger Penrose has just released his new book, with a quite provocative title: "*Fashion, faith and fantasy*…"[2]. We did not read yet his new book, but we have read his preface of this book. And we think: Now, we found someone, a quite authoritative figure in theoretical physics, who think in introspective mode. So, we dedicate this paper to Sir Roger Penrose.

It is our hope that our discussion here can bring you to a point where you begin to realize and consider the antirealism tendency in modern physics more seriously.

2. Tlön and the Moon

In his short story, Borges mentioned briefly about the Moon in Tlön. He wrote that there is no noun for moon in Tlön, but there are verbs which mean something like "moonate" or "enmoon."[1] Such an idealistic perception of the Moon, reminds us to a famous phrase by Mermin, while he describes quantum mechanics view: "*The moon is not there while nobody looks at*." This phrase captures the essence of one of central dogmas of the

[1] This paper is not intended to discuss realism-antirealism debates over the past few decades. We only discuss antirealism tendency which seems to plague modern physics. If the readers want to read more deeply into this subject, there are good papers such as by Nancy Cartwright [10] and also by Alvin Plantinga [11].

Copenhagen interpretation of QM, i.e. that the observer determines the outcome of the experiments. In other words, in Copenhagen's view: *the reality is observer-dependent*. The problem with this dogma is that it does not work for the Moon. Even if at certain moments in a day, all inhabitants in this Earth decide to not-looking at the Moon, there is certainty that the Moon will not cease to exist suddenly at the moment. In other words, we shall admit that objective reality does exist, regardless of the action of the observers. This simple story lead us to conclude that in this Earth, we must accept that the reality is not so idealistic, and that is the difference with an idealistic planet of Tlön, created out of pure fantasy.

3. Tlön and Relativity Theory

The idealistic-Berkeley attitude can be traced back to special relativity theory, which was often regarded as the beginning of modern physics. This theory has been criticized in our previous paper [4]. But now allow us to emphasize our message: that despite wide acceptance of relativity theory since 1905, it clearly has an anti-reality view. And only a few physicists have realized such a grave error, notably C.K. Thornhill [3]. In one of his remarkable papers, the late C.K. Thornhill wrote as follows: [1]

> "Relativists and cosmologists regularly refer to space-time without specifying precisely what they mean by this term. Here the two different forms of spacetime, real and imaginary, are introduced and contrasted. It is shown that, in real space-time (x, y, z, ct), Maxwell's equations have the same wave surfaces as those for sound waves in any uniform fluid at rest, and thus that Maxwell's equations are not general and invariant but, like the standard wave equation, only hold in one unique frame of reference. In other words, Maxwell's equations only apply to electromagnetic waves in a uniform ether at rest. But both Maxwell's equations and the standard wave equation, and their identical wave surfaces, transform quite properly, by Galilean transformation, into a general invariant form which applies to waves in any uniform medium moving at any constant velocity relative to the

> reference-frame. It was the mistaken idea, that Maxwell's equations and the standard wave equation should be invariant, which led, by a mathematical freak, to the Lorentz transform (which demands the non-ether concept and a universally constant wave-speed) and to special relativity. The mistake was further compounded by misinterpreting the differential equation for the wave hypercone through any point as the quadratic differential form of a Riemannian metric in imaginary space-time (x, y, z, ict). Further complications ensued when this imaginary space-time was generalised to encompass gravitation in general relativity."

According to Thornhill [3], real space-time is a four dimensional space consisting of three-dimensional space plus a fourth length dimension obtained by multiplying time by a constant speed. (This is usually taken as the constant wave-speed c of electromagnetic waves). If the four lengths, which define a four-dimensional metric (x, y, z, ict), are thought of as measured in directions mutually at right-angles, then the quadratic differential form of this metric is:[3]

$$(ds)^2 = (dx)^2 + (dy)^2 + (dz)^2 - \bar{c}^2 (dt)^2 \tag{1}$$

When the non-differential terms are removed from Maxwell's equations, i.e. when there is no charge distribution or current density, it can easily be shown that the components (E_1, E_2, E_3) of the electrical field-strength and the components (H_1, H_2, H_3) of the magnetic field-strength all satisfy the standard *wave equation*:[3]

$$\nabla \phi = \left(\frac{1}{\bar{c}^2} \right) \frac{\partial^2 \phi}{\partial t^2} \tag{2}$$

It follows immediately, therefore, that the wave surfaces of Maxwell's equations are exactly the same as those for sound waves in any uniform fluid at rest, and that Maxwell's equations can only hold in one unique reference-frame and should not remain invariant when transformed into any other reference-frame. In particular, the equation for the envelope of all wave surfaces which pass through any point at any time is, for equation (2), and therefore also for Maxwell's equations,[3]

$$(dx)^2 + (dy)^2 + (dz)^2 = \bar{c}^2 (dt)^2 \qquad (3)$$

Or

$$\frac{(dx)^2}{(dt)^2} + \frac{(dy)^2}{(dt)^2} + \frac{(dz)^2}{(dt)^2} = \bar{c}^2 \qquad (4)$$

It is by no means trivial, but it is, nevertheless, not very difficult to show, by elementary standard methods, that the general integral of the differential equation (4), which passes through (x_1, y_1, z_1) at time t_1, is the right *spherical hypercone*:[3]

$$(x - x_1)^2 + (y - y\ \ )^2 + (z - z_1)^2 = \bar{c}^2 (t - t_1)^2 \qquad (5)$$

In other words, both Maxwell equations and space itself have the *sound wave* origin.

4. Tlön and Quantum Mechanics

We admit that the Old Quantum Mechanics, i.e. Bohr's quantization rules, still kept a healthy dose of realism. But since 1926, when Erwin Schrödinger started to publish his result which then was called the Wave Mechanics, he imposed a sort of idealistic-Berkeley viewpoint, that a purely imaginary mathematical craft can explain the experiments.[6][7] We shall show here what are the errors of Schrödinger. In describing these errors of Wave Mechanics, we thank to George Sphenkov and Leonid Kreidik for their analysis of Schrödinger's work [5].

In the initial variant, the Schrodinger equation (SE) has the following form [5]:

$$\Delta\Psi + \frac{2m}{\hbar^2}\left(W + \frac{e^2}{4\pi\varepsilon_o r}\right)\Psi = 0 \qquad (6)$$

The wave function satisfying the wave equation (6) is represented as:

$$\Psi = R(r)\Theta(\theta)\Phi(\varphi)T(t) = \psi(r,\theta,\varphi)T(t) \qquad (7)$$

Where $\psi(r,\theta,\varphi) = R(r)\Theta(\theta)\Phi(\varphi)$ is the complex amplitude of the wave function, because

$$\Phi_m(\varphi) = C_m e^{\pm im\varphi} \qquad (8)$$

For standard method of separation of variables to solve spherical SE, see for example [8-9].

The Φ, Θ and T equations were known in the theory of wave fields. Hence these equations presented nothing new. Only the R was new. Its solution turned out to be *divergent*. However, Schrödinger together with H. Weyl (1885-1955), *contrary to the logic of and all experience of theoretical physics*, artificially cut off the divergent power series of the radial function R(r) at a κ-th term. This allowed them to obtain the radial solutions, which, as a result of the cut off operation, actually were the *fictitious solutions*.[5]

Furthermore, it can be shown that the time-independent SE [6-7]:

$$\nabla\Psi + \frac{2m}{\hbar^2}(E - V)\Psi = 0, \qquad (9)$$

Can be written in the form of standard wave equation [5]:

$$\nabla\Psi + k^2\Psi = 0, \tag{10}$$

Where

$$k = \pm\sqrt{\frac{2m}{\hbar^2}(E-V)}\,. \tag{11}$$

Or if we compare (10) and (6), then we have [5]:

$$k = \pm\sqrt{\frac{2m}{\hbar^2}\left(W + \frac{e^2}{4\pi\varepsilon_o r}\right)}\,. \tag{12}$$

This means that the wave number k in Schrödinger's radial wave equation is a quantity that varies continuously in the radial direction. Is it possible to imagine a field where the wave number, and hence the frequency, change from one point to another in the space of the field? Of course, it is not possible. Such wave objects do not exist in nature.

The *unphysical* nature of Schrödinger's wavefunction has created all confusing debates throughout 90 years. But such a deep problem is rarely discussed in QM textbooks, on how he arrived at his equation.

Moreover, there is also a deep *logical fallacy* made by Schrödinger:[2] It is known that Schrödinger began with Einstein's mass-energy relation then he proceeded with Hamilton-Jacobian equation. At first he came to a similar version of Klein-Gordon equation, but then he arrived to a new equation which is non-relativistic. Logically speaking, he began with a relativistic assumption and he came to a non-relativistic expression. That is *logically inconsistent* and therefore unacceptable, and Schrödinger

[2] We thank to Prof. Akira Kanda for pointing out this logical error of Schrodinger's procedure.

himself never knew where the problem lies. Until now physicists remain debating the problem of the meaning of his wavefunction, but they forget that it starts with unphysical nature of his equation. This is a common attitude of many young physicists who tend to neglect the process and logical implication of QM derivation, and they never asked whether Schrödinger equation has deep logical inconsistency or not. (The problem becomes more persistent, because most physics professors do not like such a deep philosophical question on QM. Usually they will respond: "*Shut up and calculate*.")

On experimental level, there are some limitations in applying Schrödinger equation to experiments, although many textbooks on QM usually overlook existing problems on how to compare 3D spherical solution of Schrödinger equation with experimental data. The contradiction between QM and experiments are never discussed publicly, and this is why most modern physicists hold the assertion that QM describes accurately "ALL" physical experiments; but that is an unfounded assumption. Alternatively, George Shpenkov began with classical wave equation and he is able to derive a periodic table of elements which is very close to Mendeleev's table. And this is a remarkable achievement which cannot be done with standard Wave Mechanics.[3]

5. Tlön and Theoretical Physics

[3] For further discussion, it is advisable to check the website of Dr. George Shpenkov, at http://shpenkov.janmax.com. See especially Shpenkov, George P. 2013. *Dialectical View of the World: The Wave Model (Selected Lectures).* Volume I: Philosophical and Mathematical Background. URL: http://shpenkov.janmax.com/Vol.1.Dialectics.pdf

Nancy Cartwright is Associate Professor of Philosophy from Stanford University. She wrote an interesting book with quite interesting title: **How The Laws of Physics Lie**. The following paragraph is a quote from the first page of her book:

> "Nancy Cartwright argues for a novel conception of the role of fundamental scientific laws in modern natural science. If we attend closely to the manner in which theoretical laws figure in the practice of science, we see that despite their great explanatory power these laws do not describe reality. Instead, fundamental laws describe highly idealized objects in models. Thus, the correct account of explanation in science is not the traditional covering law view, but the 'simulacrum' account. On this view, explanation is a matter of constructing a model that may employ, but need not be consistent with, a theoretical framework, in which phenomenological laws that are true of the empirical case in question can be derived. *Anti-realism* about theoretical laws does not, however, commit one to anti-realism about theoretical entities. Belief in theoretical entities can be grounded in well-tested localized causal claims about concrete physical processes, sometimes now called '*entity realism'*. Such causal claims provide the basis for partial realism and they are ineliminable from the practice of explanation and intervention in nature."

In other words, we can conclude from the prelude of her book that she asserts that there is a shift from traditional view, i.e. modern physics now seems to view that "explanation is a matter of constructing a model that may employ, but need not be consistent with, a theoretical framework, in which phenomenological laws that are true of the empirical case in question can be derived."

6. A few preliminary remarks on Penrose's Fashion, Faith, Fantasy

In preface of his book, Sir Roger Penrose discusses how fashion, faith and fantasy may have played their roles in the recent development of theoretical physics and cosmology. In particular he wrote as follows:[2]

"In the first three chapters, I shall illustrate these three eponymous qualities with three very well-known theories, or families of theory. I have not chosen areas of relatively minor importance in physics, for I shall be concerned with what are big fish indeed in the ocean of current activity in theoretical physics. In chapter 1, I have chosen to address the still highly fashionable string theory (or superstring theory, or its generalizations such as M-theory, or the currently most fashionable aspect of this general line of work, namely the scheme of things referred to as the ADS/CFT correspondence). The faith that I shall address in chapter 2 is an even bigger fish, namely that dogma that the procedures of quantum mechanics must be slavishly followed, no matter how large or massive are the physical elements to which it is being applied. And, in some respects, the topic of chapter 3 is the biggest fish of all, for we shall be concerned with the very origin of the universe that we know, where we shall catch a glimpse of some proposals of seeming sheer fantasy that have been put forward in order to address certain of the genuinely disturbing peculiarities that well-established observations of the very early stages of our entire universe have revealed."[2]

In other words, Sir Roger Penrose seems to argue that some of the most fashionable theories may gather followers simply because they are fashionable. And the proponents of Quantum Mechanics appear to follow strictly these procedures out of pure faith.

Penrose also suggest that there are certain experiments: "*Perhaps the results of such experiments may indeed undermine the unquestioning quantum-mechanical faith that seems to be so commonly held*."[2]

Apparently Penrose want to say that from time to time, these fashionable trends and also faith and also fantasy, need to be put under scrutiny.

Penrose also criticizes the faith in supra-dimensionality in string and superstring theories, as he noted: "*Such supra-dimensionality is a central contention of almost all of modern string theory and its major variants. My critical arguments are aimed at the current string-motivated belief that the dimensionality of physical space must be greater than the three that we directly experience*."[2]

7. Concluding Remarks

We admit that the general tone of this paper may sound a bit too critical to some readers. But what we want to achieve with this paper is quite simple: Allow us to remind all fellow physicists and cosmologists to become more aware of antirealism tendency, which may be caused by too much abstractions in developing physical theories. Yes, theoretical abstraction is necessary in almost every case, but it also healthy to keep in mind a good advice by Prof. Murray Gell-Mann. He often reminded younger physicists to keep a balance between Scylla and Charybdis, i.e. in developing theories one should maintain a healthy dose of realism beside (pure) abstractions.

We observe that many advanced physical theories which have been proposed during the last few decades have become increasingly too "*baroque*", i.e. they tend to use too many mathematical abstractions, while they seem to discard a healthy dose of realism.

Does it mean that an idealistic-Berkeley tendency of so many modern physical theories, such as string/superstring theories, M-theory et al., imply that they have no physical meaning? We do not pretend to know all the answers, nor we pretend to have mastery over these very difficult subjects.

All we can say is that perhaps now is the time to distinguish fashion, faith and fantasy in modern physics (as advocated by Sir Roger Penrose). And it will be quite healthy to remind ourselves from time to time the so-called *Ockham's razor* principle, which can be reformulated as follows: "the least complicated explanation (read: physical theories) may have a good chance to be the correct answer."

Acknowledgment

We dedicate this paper to Sir Roger Penrose, a prolific author and a very insightful mathematical-physicist.

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References:

[1] Jorge Luis Borges. Tlön, Uqbar, Orbis Tertius. In *Collected Fictions*, Translated by Andrew Hurley. USA: Penguin Putnam Inc., 1998. (Originally published under the title: *The Garden of Forking Paths*, 1941).

[2] Sir Roger Penrose. Are Fashion, Faith, or Fantasy relevant to Fundamental Science? Preface to book volume: *Fashion, Faith, Fantasy in the New Physics of the Universe*. Copyright at Princeton University Press.

[3] C.K. Thornhill. Real or imaginary space-time? Reality or Relativity? *Hadronic Journal Suppl*. 11, 3, (1996) 209-224

[4] Victor Christianto, Florentin Smarandache, Yunita Umniyati. From Acoustic Analog of Space to Acoustic Sachs-Wolfe Theorem: A Model of the Universe as a Guitar. Published in *Prespacetime Journal*, March 2017. http://www.prespacetime.com

[5] Shpenkov, George P. & Kreidik, Leonid G. 2005. Schrödinger's error in principle. *Galilean Electrodynamics* Vol. 16, No. 3, 51-56 URL: http://shpenkov.janmax.com/Blunders.pdf

[6] Schrödinger, Erwin. 1926. Quantisation as a Problem of Proper Values. Part I. In *Collected papers in Wave Mechanics*. (Providence, Rhode Island: AMS Chelsea Publishing). URL: http://einstein.drexel.edu/~bob/Quantum_Papers/Schr_1.pdf

[7] _______. 1926. An Undulatory Theory of the Mechanics of Atoms and Molecules. *The Physical Review*. Second series.Vol. 28, No. 6. (Dec. 1926): 1049-1070.

[8] Anonymous, *Atomic Spectra*, p.19-21, URL: http://astrowww.phys.uvic.ca/~tatum/stellatm/atm7.pdf

[9] Fowler, Michael. 2007. *Classical Wave Equations*, p.10-12. URL: http://galileo.phys.virginia.edu/classes/252/Classical_Waves/Classical_Waves.pdf

[10] Nancy Cartwright. *How the Laws of Physics Lie*. E-book format, 147 pp.

[11] Alvin Plantinga. How to be an Anti-Realist. *Proceedings and Addresses of the American Philosophical Association,* Vol. 56, No. 1. (Sep. 1982), pp. 47-70.

Borges and the Subjective-Idealism in Relativity Theory and Quantum Mechanics

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ABSTRACT

This paper is intended to be a follow-up to our previous paper with title: "Reinterpreting Tlon, Uqbar, Orbis Tertius: On the antirealism tendency in modern physics." We will give more background for our propositions in the previous paper. Our message here is quite simple: allow us to remind fellow physicists and cosmologists to become more aware of Berkeley-idealism tendency, which can lead us to so many distractions instead of bringing us closer to the truth. We observe that much of the progress of modern physics in the last few decades only makes us as confused as before, but at a much higher level. In the last section, we will give some examples of how we can do something better than existing practice of physics in the past.

Keywords: realism-antirealism discourse, modern physics, theoretical physics, modern cosmology

Quote:
"We don't need no education,
We don't need no thought control..."
Pink Floyd - *Another Brick in the Wall*, part 2 (11)

1. Prologue

If we read Thomas Kuhn's *The Structure of Scientific Revolutions*(10), we can get a false impression that modern science is all abou cooking up our ideas to the point that they will be accepted by the consensus of respected scientists. Yes, Kuhn's ideas are closer to *constructivism*. He seems to give this message: all activities in science are aiming to construct a model or theory which can be accepted by as wide as possible scientific community. It is no more about finding the hidden truth of nature.

But if we recall the history of science, since Tycho Brahe, Copernicus, Galileo, Newton...they seem to care not about the consensus at the time. They just dig deeper with observations and also analytical work, and once they were convinced, they stood up because of their conscience.

Therefore, if we learn from such a long history of great scientists, all we can say is that science advances not because some people trying so hard to make revolutions (as suggested by Kuhn), but it advances because some careful scientists choose to stand up for their conscience, no matter what happens.

Yes, it is unfortunate that in most cases, a consensus of scientists can be so wrong. As one wisdom saying puts it: "*Follow a thousand flies, and you will end up eating shit*." Such a grave mistake in the past includes: epicycles in Ptolemian cosmology, which then it was replaced with heliocentric model of Copernicus. In modern physics, we find quite similar monsters as a result of widely accepted theories. Those monsters appear because we tend to call everything we don't know as dark or ghost: there are many ghosts in recent cosmology models, and there are dark matter and dark energy hypothesis too. All of them seem to indicate that we should begin to think in reflective mode, and find out where we have gone so wrong.

How can it be that such a consensus of scientists can lead to terrible errors? Perhaps we can recall the lyrics of Pink Floyd above, to remind us that in almost all levels of education, there is a kind of "thought control," and it is no more education. And it implies that there is probably a hidden force behind such a thought control.

The possibility of existence of such a hidden force who exerts control over the entire planet has never been discussed openly in philosophy books, nor in Kuhn's book. But they are seemingly quite real.

These remarks put us into the context of this paper, i.e. Borges reminds us of a possibility that a bunch of academic luminaries tries to create their own world out of pure fantasy. They are called 'Orbis Tertius' society in Borges's short story. They start with Berkeley's idealism philosophy, but ultimately they want to reject the reality itself. Shall we call this move as "modern science"?

2. Why shall we start with Borges?

Some readers of our previous paper may wish to ask: Why shall we start with Borges? Or, is it possible to cure fantasy with fantasy?

Well, yes we start with Borges's fiction book, but only as per necessary in order to expose paradox and difficulties with the Berkelyan subjective idealism, which is often ignored in contemporary discussions by theoretical physicists. Who can realize our own "rotten-tomatoes" tendency to reject objective reality with our theories?

There is more to say about Borges, and his line of arguments using a method called "*reductio ad absurdum*." But we do not pretend to be well-versed with all related philosophical arguments.

Interested readers are advised to read Jon Stewart's study on that Borges's short story (1).

3. Einstein as a subjective mathematical idealist

For those who find it difficult to accept that Einstein was a subjective idealist, albeit he was quite a realist compared to other QM proponents, let us begin with his own words:

"If, then, it is true that the axiomatic basis of theoretical physics cannot be extracted from experience but must be freely invented, can we ever hope to find the right way? I answer without hesitation that there is, in my opinion, a right way, and that we are capable of finding it. I hold it true that pure thought can grasp reality, as the ancients dreamed." (Albert Einstein, 1954) (13).

We wish to highlight the last phrase here: "pure thought can grasp reality, as the ancients dreamed." This phrase captures the essence of Einstein's idealism philosophy. He strived to prove that pure thought alone is sufficient, based on human imagination. That is why his other famous saying goes: "Imagination is more important than knowledge." What he meant with this saying seems to be obvious: he is very sure that human knowledge is a result of free invention out of imaginative minds. Einstein rejects the possibility that God is the ultimate source of true knowledge. Yes, Einstein wants to know how God thinks and created the world, but by his own imaginative way, not by following God.

We can recall a paper by Kurt Godel around 1949: "*Remark about relationship between Relativity theory and idealistic philosophy*."(28) This paper indicates that such an idealism debate in the context of Relativity Theory was not really new at all, at least to some philosophers at the time.

Therefore, we wish to emphasize here: while we admit that Einstein stood against *Quantum Solipsism* (their way of playing with reality), in the end of the day he was also one of key figures in opening up such an idealism position, i.e. his invention and adherence to Relativity Theory.

In this way, we can understand why there were no discussions anymore on the substratum structure of aether, after Relativity Theory was widely accepted by scientific community.

It was fortunate, that after some years from inventing General Relativity, apparently Hendrik A. Lorentz persuaded Einstein to admit the role of aether. And Einstein apparently listened to his senior's advise. He made public statement something like: "*General relativity without aether is unthinkable*." See his Leiden Lecture, 5 May 1920 (26).

After all, Einstein was a human being with the same confusions just like many of us, at a deeper level. He made his own mistakes, but he tried his best to repair his mistakes, just like in Leiden Lecture (Ether and Relativity), and also his strong refutation to probabilistic view of Quantum Mechanics (Copenhagen school).

4. Bohr and Heisenberg's subjective idealism attitude

As Henry Lindner puts it: *'Einstein was a subjectivist mathematical idealist. ...His physics consists of mathematical models of subjective experience - his sensations and measurement*."(6)

This approach can be observed clearly in his Special Relativity Theory paper, where he used the synchronization of clocks to prove his points. And in his General Relativity theory, he also began with a mental imagination, which he called "*gedanken-eksperiment*." In other words, in developing these two theories, Einstein relied on his mental models, instead of seeking deeper truth of electrodynamics or gravitation. Yes, history told us that his approach won the fame and glory at the time, and many people regard that his theory of gravitation supersede so many other gravitation theories, including by famous experimenters at the time such as Nikola Tesla (who proposed "Dynamical Gravitation Theory," where he unified electromagnetic theory and gravitation).

Such an emphasis on measurement and the role of subjective sensation seems to inspire younger generation of physicists at the time, perhaps including Bohr and Heisenberg, who held the viewpoint something like: "it is not our task in physics to speak about the truth, but only what we can speak about experiments."

Again, to quote Henry Lindner: "*Quantum Mechanics - evolved from Einstein's Quantum Theory- is instead a probabilistic model of observer's experience of quantized light/matter interaction*."(6)

It is no surprise therefore that it leads to so many contradictions and confusions, one of paradoxes is known as Schrodinger's cat paradox.

5. Berkelian-idealism in Quantum Mechanics and its resulting contradictions

Let us begin with a quote from Einstein: "*Quantum mechanics is very impressive. But an inner voice tells me that it is not yet the real thing. The theory yields a lot, but it hardly brings us any closer to the secret of the Old One. In any case I am convinced that He doesn't play dice*." - Albert Einstein(12).

This view can be rephrased by quoting remarks by Marcoen Cabbolet: "*a form of Berkeley idealism is entailed in the Orthodox Quantum Mechanics."(*7) Cabbolet also concludes that it is therefore impossible to try to derive Quantum Mechanics in curved space, because curved space in General Relativity requires energy, i.e. they requires objective reality without observers.(7) If we follow his argument, it is clear that all attempts to find a correct theory of Quantum Gravity is just a matter of contradiction and confusions of their basic concepts.

Einstein took a position against other QM proponents, especially the Gottingen trio and also Niels Bohr in Copenhagen. It was unfortunate for him, that after a series of debates, Bohr won the heart of mainstream physicists at the time.

But Einstein remained in his standpoint, for example he expressed his view in a famous paper published at 1935 discussing incompleteness of QM.

Only a few physicists agreed with him to stand against the mainstream who held the Copenhagen interpretation. Notably, Louis de Broglie and also Erwin Schrodinger.

Later on, Schrodinger also made a public statement around 1955 while he was in Dublin Institute of Advanced Studies, something like this: "I reject the whole Quantum Mechanics." That statement must be heard because it was spoken by one of the inventors of QM theory. Schrodinger in his later life declared publicly that he refuted the wave-particle duality which was widely accepted at the time (until now), and instead he suggested a "*wave only*" view. See also (27).

6. What can we do now?

In the previous section, we have discussed that Einstein has subjective idealism tendency. But regarding his attitude to cosmology, we have great respect on his humble attitude toward God, as expressed in the following quote:

"*We are in the position of a little child entering a huge library filled with books in many different languages. The child knows someone must have written those books . It does not know how. It does not understand the languages in which they are written. The child dimly suspects a mysterious order in the arrangement of the books but doesn't know what* *it is. That, it seems to me, is the attitude of even the most intelligent human being toward God. We see a universe marvelously arranges and obeying certain laws, but only dimly understand these laws. Our limited minds cannot grasp the mysterious force that moves the constellations*." - Albert Einstein(12).

Therefore, apparently we should accept that a humble attitude toward God is a good starting point in all kinds of theoretical physics, mathematical physics, particle physics and ultimately in developing cosmology models. Because we shall admit with modesty, that we do not know either the smallest entities of elementary particle world, nor we know the largest structure of void, filaments, and galaxy clusters and so on.

In almost every case, the entire modern physics rely too much on feeble guessing and rough experiments and also on observation apparatus with all their shortcomings and limitations. And we shall also admit that no one ever travels yet over the entire Milky Way galaxy, so we shall keep ourselves in humble admiration toward the God, the Ultimate Creator.

Beside all of these, of course we do not wish to ask all of you fellow physicists and cosmologists to return to the old days of physics in 18th or 19th centuries. Yes, we can mention a few physicists who admit that perhaps all the whole modern physics have gone astray:

a. Dirac tried to develop a classical model of electron, and published his paper around 1951, although his paper is less known compared to his famous equations in 1927. See (23).

b. Richard Feynman admitted that the complicated renormalization procedures in QED are nothing more than "sweeping under the rug." (24) He seems to call for a better ways in dealing with infinities problem. That Feynman's remark perhaps can be understood better if we remember an old joke: "*The problem with computer programmers is that they often cheat in order to get results. The problem with mathematicians is that they often work with simple models in order to get results. But the problem with physicists is even worse: they often cheat with models in order to get results."* (We are aware that we should not include a joke in a scientific paper like this, and allow us to apologize for this. But we also know that sometimes a good joke can be much more insightful, than ten or twenty mediocre papers.)

c. Peter Woyt also laments about the recent trend of so many talented physicists to rely too much in celebrated superstring, string, or M-theory. Woyt is a Canadian mathematician who felts uneasy with such a marching crowd of string theorists, then he published his book with title: "*Not even wrong*."(25)

d. Sir Roger Penrose also reminds fellow theoretical physicists of possible distractions caused by following fashions, faith, or fantasy.

Now, if some readers want to ask us: so what do you advise? Again, it is not our aim to return the whole physical sciences to their 18th or 19th century phases. What we got in mind is perhaps it would be a good start to begin with a "*Retro-Classical physics."* What we mean with "retro" here, is to return to some old ideas, but reworking them in new approaches. Let us give a few examples of what we mean with Retro-Classical physics:

a. Timothy Boyer has published a series of papers where he proves that Planck blackbody radiation law can be derived from (stochastic) electrodynamics theory. The message here is to rework Planck law from classical physics, but introduce a new stochastic assumption.

b. Pierre-Marie Robitaille has published a series of papers where he proved that Kirchoff is flawed. Does it mean that the Planck law is also flawed? It is a deep question which needs to be clarified.(14)

c. George Shpenkov and Leonid Kreidik have analyzed the errors in Schrodinger equations, then they worked out a new method to derive a periodic table of elements which is similar to Mendeleev table. Their novel method is based on working out a spherical solution of classical wave equation.

d. These authors have also published a few papers where we extended further Shpenkov's spherical classical wave equation to become a "*fractal vibrating string*" model. We admit that our model is in early phase, but this model offers the same conceptual simplicity of string theory, but without complicated problems caused by its supra-dimensionality (26 dimensions) that some variants of string theories suffer.

e. AdS/CFT. We heard that there is recent progress i.e. that some mathematicians have proved that there is theoretical correspondence between AdS/CFT and Navier-Stokes turbulence.(15) If we are not mistaken, this result brings us to possibility to consider cosmology starting from turbulence theory. And compare it with other papers discussing connection between Zeldovich approximation, Burgers' turbulence, and also adhesion model (Johan Hidding). See our paper (16).

f. Yang-Mills. If we recall that Yang-Mills theory is originally a classical field theory, then it seems possible to argue for a classical model of hadrons. A few years ago, one of us tried to publish a short paper discussing possible extension of Classical Yang-Mills theory to fractal case.(17) We are aware that this is an unpopular approach, but again it seems worth to ask: is it possible to describe hadrons and leptons in terms of classical electrodynamics?

g. Isomorphism. For those readers who are adept in QM, allow us to say that there is known derivation of Maxwell-Dirac isomorphism. Check our recent paper in Prespacetime Journal, October 2017.(18)

h. LENR. Usually a nuclear fusion is explained in quantum mechanical way. But in a recent paper published in JCMNS, we argue that Coulomb barrier suppression can also be thought of from pure classical arguments. Check our paper (19).

i. Friedmann. In cosmology setting, it is known that Friedmann equations can be derived from Newtonian arguments, i.e. without complicated general relativity as starting point. While it is good to start afresh with such a Newtonian-Friedmann approach, we shall also keep in mind that Friedmann equations have limitation, i.e. they do not take into account the rotation in early universe. In a recent paper, we prove that if we consider vortical-rotation in early universe, then we will obtain an Ermakov-type equation. We already got numerical solution and plots of such an Ermakov-type equation in cosmological setting.(20)

j. 3D Navier-Stokes. After several futile attempts, this year we have found a numerical solution of 3D Navier-Stokes equations with the help of Wolfram Mathematica. We presented this result in a mathematical conference held in Bali, July 2017. Check also (21). This result rekindled our previous cosmology model based on Navier-Stokes equations in Cantor sets.(22) Whether this model has theoretical correspondence with AdS/CFT theory (string-turbulence) or not, remains an open question.

7. Concluding Remarks

We have explained some arguments that both Relativity Theory and Quantum Mechanics have Berkelyan subjective idealim tendency. And the same tendency have plagued almost all aspects of modern physics as we know today. Other authors discussing this point of view have been cited too, although there are few who tried to defense quantum idealism, see Mikhail Popov (5) and also Erik Haynes (8).

In the last section we already outlined a few examples of recent development in theoretical physics and cosmology. We hope that those examples are sufficient as illustrations of what we meant with Retro-Classical Physics, and it seems that these are worth exploring further.

This is our message in the bottle, and we wish that some readers will find it in bing or google's shore. We do hope that we can write this message better, but unfortunately we are not professional philosophers by training. All we got are just our own mistakes in the past, and a little gut feeling that keeps telling us that we have done terrible mistakes. Yes, all of us have done our mistakes in our own ways. And we will take these mistakes to our graveyard, and even to eternity. Now is the time to repair those mistakes as far as we can. We have heard about secret societies here and there, but it is not the purpose of this paper to disclose any secret society, let alone the Orbis Tertius. All we can say is that our feeble minds are so prone to fall into so many distractions, including but not limited to the subjective idealism. The history of Quantum Mechanics in the past taught us that rejecting reality led us to nowhere. In fact, this antirealism tendency has led us to endless paradoxes and contradictions as we have observed in the last 90 years. Therefore, the best way to repair our grave mistakes is by returning back a healthy dose of realism into our theoretical models. And let the younger generations of physicists to learn to respect the realism. They should unlearn and relearn from so many mistakes in the past including our mistakes.

All in all, allow us to end this paper with a quote from Orwell: "*In a time of universal deceit - telling the truth is a revolutionary act.*" (George Orwell)

Acknowledgment

This paper is part of our investigation in the last eleven years, and perhaps earlier, on what are the true physical meaning of Schrodinger's wavefunction and also quantization rules in astrophysics. You can check our book in 2006 discussing Schrodinger equation from the perspective of multivalued logic. We admit that we have also followed fancy and fashion, and we made our mistakes too. We were so blind and got lost from reality.
Thanks God, He made us to see again with clarity. This paper is our act of repentance.
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VC & FS***
***From two unprofitable servants.

References:

(1) Jon Stewart. Borges and the refutation of idealism. Ideas Y Valores no. 101, Agosto 1996, Bogota - Colombia. Url: https://revistas.unal.edu.co/index.php/idval/article/viewFile/21819/22795

(2) Miles Mathis. http://milesmathis.com/quant.html

(3) Berkely's ideas in physics. Url: http://goodxbadx.blogspot.co.id/2009/07/berkelys-ideas-in-physics.html

(4) Lothar Schafer. Url: http://realitysandwich.com/217334/is-quantum-physics-a-sort-of-idealism/

(5) Mikhail Popov. In defence of quantum idealism. Physik-Uspekhi 2003. Url: http://www.johnboccio.com/research/quantum/notes/popov.pdf

(6) Henry H. Lindner. Beyond consciousness to cosmos. Url: http://henrylindner.net/Writings/Cosmism/Trilogy1.pdf

(7) Marcoen Cabbolet. Berkelian idealism regarding properties of the Orthodox Quantum Mechanics. Url: https://www.researchgate.net/profile/Marcoen_Cabbolet/publication/279220880_Berkelian_Idealism_Regarding_Properties_in_Orthodox_Quantum_Mechanics_and_Implications_for_Quantum_Gravity/links/55f5e97d08ae1d9803974e24/Berkelian-Idealism-Regarding-Properties-in-Orthodox-Quantum-Mechanics-and-Implications-for-Quantum-Gravity.pdf

(8) Erik Haynes. A case of monistic idealism. Thesis defense 2016. Url: http://digitalcommons.liberty.edu/cgi/viewcontent.cgi?article=1414&amp=&context=masters

(9) Matthew J. Donald. Realism, the interpretation of Quantum Mechanics, and Idealism. The Cavendish Laboratory, Cambridge. Url: http://people.bss.phy.cam.ac.uk/~mjd1014/real.html

(10) Thomas Kuhn. The structure of scientific revolutions. Second edition. Url: http://projektintegracija.pravo.hr/_download/repository/Kuhn_Structure_of_Scientific_Revolutions.pdf

(11) Pink Floyd. Another brick in the wall, part 2. Url: http://www.metrolyrics.com/another-brick-in-the-wall-part-2-lyrics-pink-floyd.html

(12) Albert Einstein. http://www.alberteinsteinsite.com/quotes/einsteinquotes.html

(13) Albert Einstein. http://www.spaceandmotion.com/Albert-Einstein-Quotes.htm

(14) Pierre Marie Robitaille. Check his papers in Progress in Physics. Url: http://ptep-online.com

(15) Gravity and the shape of turbulence. String Phenomenology 2009. Url: http://www.fuw.edu.pl/~sp09/StringPheno09/StringPheno09_files/oz_sp09.pdf

(16) Victor Christianto & Florentin Smarandache. From Zeldovich Approximation to Burgers' Equation:

a Plausible Route to Cellular Automata Adhesion Universe. This paper has been submitted to Prespacetime J. See also Vixra:1710.0012 (2017).
(17) Victor Christianto. An Extension of Maxwell Representation of Non-Abelian Su(3) Yang-Mills Theory on Cantor Sets. Vixra: 1505.0214 (2014).
(18) Victor Christianto & Florentin Smarandache. A Review of Two Derivations of Maxwell-Dirac Isomorphism and a Few Plausible Extensions. Prespacetime Journal, oct. 2017, www.prespacetime.com. See also Vixra: 1705.0357 (2017)
(19) Victor Christianto, Yunita Umniyati, & Volodymyr Krasnoholovets. On Plausible Role of Classical Electromagnetic Theory and Submicroscopic Physics to Understand and Enhance Low Energy Nuclear Reaction (Lenr): a Preliminary Review. J. Cond. Mat. Nucl. Sci. Vol. 22, april 2017. Url: http://www.iscmns.org, see also vixra: 1611.0161
(20) Victor Christianto, Florentin Smarandache, Yunita Umniyati. Solving Numerically Ermakov-type Equation for Newtonian Cosmology Model with Vortex. Prespacetime J, oct. 2017, www.prespacetime.com. See also vixra: 1708.0189
(21) Victor Christianto & Sergey Ershkov. Solving Numerically a System of Coupled Riccati ODEs for Incompressible Non-Stationary 3D Navier-Stokes Equations. Presented in ISCPMS, july 2017, url: https://iscpms.ui.ac.id/. See also Vixra: 1705.0035.
(22) Victor Christianto. A Possible Route to Navier-Stokes Cosmology on Cantor Sets. Prespacetime J, 2015, www.prespacetime.com. See also vixra:1508.0042
(23) P.A.M Dirac. Proc. London Soc. 1951. See also Max Born, http://www.nature.com/articles/doi:10.1038%2F1691105a0
(24) Richard Feynman. http://caltechcampuspubs.library.caltech.edu/662/1/1965_10_22_67_5_.05.pdf
(25) Peter Woyt. Not even wrong, ten years later. Url: http://www.math.columbia.edu/~woit/rutgers.pdf
(26) Albert Einstein. Ether and relativity. Lecture given at University of Leiden, 5 May 1920. Url: http://www-history.mcs.st-and.ac.uk/Extras/Einstein_ether.html
(27) Erwin Schrodinger. "Against the stream - Schrodinger interpretation of QM," url: https://www.sciencedirect.com/science/article/pii/S1355219897000129
(28) Kurt Godel. Remark about the relationship between relativity theory and idealistic philosophy. In Albert Einstein: Philosopher Scientist. Evanston: Library of Living Philosophers, 1949, p. 555.

Thinking Out Loud on Early Creation through the Lens of Hermeneutics of Sherlock Holmes

(Towards a Model of Universe based on Turbulence-Generated Sound Theory)

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Abstract

In recent years, apparently the Big Bang as described by the Lambda CDM-Standard Model Cosmology has become widely accepted by majority of physics and cosmology communities. Even some people have concluded that it has no serious alternative in horizon. Is that true? First, as we argued elsewhere, Big Bang story relies on singularity. In other words, when we are able to describe the observed data without invoking singularity, then Big Bang model is no longer required. Therefore, here we explore a few alternative stories other than Big Bang story, which most cosmologists believe it is the nearest to Biblical account of creation. We would argue that re-reading of Genesis 1:2 will lead us to another viable story, albeit the alternative has not been developed rigorously as LCDM theories. We also briefly discuss a fluid Maxwell equations of Prof. Tsutomu Kambe based on vortex sound theory.

Key Words: Maxwell electromagnetic theory, singularity-free cosmology model, vortex sound theory, early Universe, early creation, Genesis chapter 1, Spirit in Creation.

1. Introduction

One of the biggest mysteries in cosmogony and cosmology studies is perhaps: how to interpret properly Genesis chapter 1:2. Traditionally, philosophers proposed that God created the Universe out of nothingness (from reading "empty and formless" and "*bara*" words; this contention is called "*creation ex nihilo*."). Understandably, such a model can lead to various interpretations, including the notorious "cosmic egg" model as suggested by Georges Lemaitre, which then led to Big Bang model. Subsequently, many cosmologists accept it without asking, that Big Bang stands as the most faithful and nearest theory to Biblical account of creation. But we can ask: Is that cosmic egg model the true and faithful reading of Genesis 1:2?

In the subsequent chapter we will discuss how to answer this question by the lens of hermeneutics of Sherlock Holmes. This is a tool of mind which we think to be a better way compared to critical hermeneutics.

Now a word on the meaning of thinking out loud phrase. What we mean with this phrase is, according to a definition:

> **Thinking out loud** is the act of expressing in recoverable and external form new thoughts which you encourage your mind into exploring. Often these lead to new avenues of thought. When you **think out loud** you detect and explore ideas and concepts which are either unknown, or as yet unexplored.[1]

2. Several different interpretations of Genesis 1:2 and implications

Our discussion starts from the fundamental question that one of us (VC) has heard around three years ago. At the time, he (VC) has had a good time of conversation at Starbuck with a senior pastor who happens to be one of the most leading scholar from Jakarta Theology and Philosophy Seminary, i.e. Dr. Joas Adiprasetya (JA). VC tried to explain to him his idea on interpreting of Prolegomena of John Gospel as one of reliable biblical account of creation. In essence, one of us (VC) told JA that it appears possible to interpret the Logos as the Sacred Voice of God, then from voice we can infer sound wave, then from sound wave we can infer frequency. Therefore, we can infer that there should be primordial/relic sound wave which emerged at the earliest time of creation. [10-13] And Prof. Wayne Hu has written a paper about observation of such relic sound wave.

But JA asked him (VC): okay, then where was the role of Holy Spirit in that creation story based on John 1:1? I should admit that at the time I cannot come up with a convincing answer. I only said: “I do not think of that yet.”

And it took around three years before now we have been thinking this problem out loud, and here our answer can be summarized as follows: “The relic sound wave in early creation is a faithful interpretation of John 1:1, but we can come up with a more complete picture if we combine it with Gen. 1:2, that is the Holy Spirit came to hovering over the primordial fluid, then a kind of hurricane/storm started which created perfect medium where God spoke (Logos).”

[1] wiki.c2.com/?ThinkingOutLoud

Let us consider some biblical passages:

- What is *Hermeneutics of Sherlock Holmes*?
  One article suggests:[2]
  Holmes: "I have no data yet. It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts."
  Far too often students of the Bible (and cosmology folks as well) twist verses to suit interpretations instead of formulating interpretations to suit what the verses say.
  Guide: Don't approach your passage assuming you know what it means. Rather, use the data in the passage – the words that are used and how they fit together – to point you toward the correct interpretation.

- A re-reading of Gen. 2:7 with Hermeneutics of Sherlock Holmes[3]

  If we glance at Gen. 2: 7, we see at a glance that man is made up of the dust of the ground (*adamah*) which is breathed by the breath of life by God (*nephesh*). Here we can ask, does this text really support the Cartesian dualism view?

  We do not think so, because the Hebrew concept of man and life is integral. The bottom line: it is not the spirit trapped in the body (Platonic), but the body is flowing in the ocean of spirit. [7]

  Let's look at three more texts:

a. Gen. 1: 2, "*The earth is without form and void, darkness over the deep, and the Spirit of God hovering over the waters*." Patterns such as Adam's creation can also be encountered in the creation story of the universe. Earth and the oceans already exist (similar to *adamah*), but still empty and formless. Then the Spirit of God hovered over it, in the original text "*ruach*" can be interpreted as a strong wind (storm). So we can imagine there is wind/hurricane, then in the storm that God said, and there was the creation of the universe. See also Amos Yong [6], also Hildebrandt [15]. From a scientific point of view, it is well known in aerodynamics that

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[2] https://www.str.org/blog/learning-hermeneutics-from-holmes
[3] Check Eric McKiddie's article: https://www.thegospelcoalition.org/blogs/trevin-wax/10-tips-on-solving-mysterious-bible-passages-from-sherlock-holmes/

turbulence can cause sound (*turbulence-generated sound*). And primordial sound waves are indeed observed by astronomers.

b. Ps. 107: 25, "*He said, he raised up a storm that lifted up his waves*." The relation between the word (sound) and the storm (turbulence) is interactive. Which one can cause other. That is, God can speak and then storms, or the Spirit of God causes a storm. Then came the voice.

c. Ezekiel. 37: 7, "*Then I prophesy as I am commanded, and as soon as I prophesy, it sounds, indeed, a crackling sound, and the bones meet with one another."* In Ezekiel it appears that the story of the creation of Adam is repeated, that the Spirit of God is blowing (storm), then the sound of the dead bones arises.

The conclusion of the three verses above seems to be that man is made up of *adamah* which is animated by the breath or Spirit of God. He is not matter, more accurately referred to as spirit in matter. Like a popular song around 80s goes: "*We are spirits in the material world*."

3. A physical model of turbulence-generated sound for early Universe

Our discussion starts from the fundamental question: how can we include the rotation in early Universe model? After answering that question, we will discuss how "turbulence-generated sound" can be put into a mathematical model for the early Universe. We are aware that the notion of turbulence-generated sound is not new term at all especially in aerodynamics, but the term is rarely used in cosmology until now. We shall show that 3D Navier-Stokes will lead to non-linear acoustics models, which means that a turbulence/storm can generate sound wave.

a. How can we include rotation in early Universe model?

It has been known for long time that most of the existing cosmology models have singularity problem. Cosmological singularity has been a consequence of excessive symmetry of flow, such as "Hubble's law". More realistic one is suggested, based on Newtonian cosmology model but here we include the vortical-rotational effect of the whole Universe.

In this section, we will derive an Ermakov-type equation following Nurgaliev [8]. Then we will solve it numerically using Mathematica 11.

After he proceeds with some initial assumptions, Nurgaliev obtained a new simple local cosmological equation:[8][9]

$$\dot{H} + H^2 = \omega^2 + \frac{4\pi G}{3}\rho, \tag{1}$$

Where $\dot{H} = dH / dt$.

The angular momentum conservation law ωR^2 = const = K and the mass conservation law $(4\pi/3)\rho R^3$ = const = M makes equation (5) solvable:[9]

$$\dot{\mathrm{H}} + \mathrm{H}^2 = \frac{K^2}{R^4} - \frac{\mathrm{GM}}{\mathrm{R}^3}, \tag{2}$$

Or

$$\ddot{R} = \frac{K^2}{R^3} - \frac{GM}{R^2}. \tag{3}$$

Equation (3) may be written as Ermakov-type nonlinear equation as follows;

$$\ddot{R} + \frac{GM}{R^2} = \frac{K^2}{R^3}. \tag{4}$$

Nurgaliev tried to integrate equation (3), but now we will solve the above equation with Mathematica 11. First, we will rewrite this equation by replacing GM=A, K^2=B, so we get:

$$\ddot{R} + \frac{A}{R^2} = \frac{B}{R^3}. \tag{5}$$

As with what Nurgaliev did in [8][9], we also tried different sets of A and B values, as follows:

a. A and B < 0

```
A=-10;
B=-10;
ODE=x''[t]+A/x[t]^2-B/x[t]^3==0;
sol=NDSolve[{ODE,x[0]==1,x'[0]==1},x[t],{t,-10,10}]
Plot[x[t]/.sol,{t,-10,10}]
```

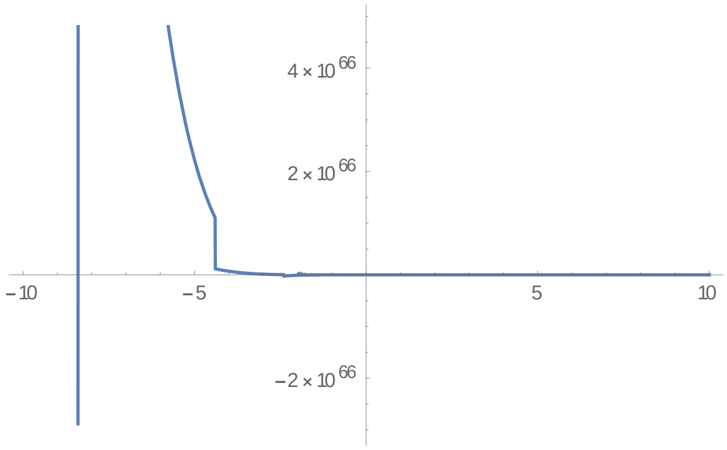

Figure 1. Plot of Ermakov-type solution for A=-10, B=-10

b. A > 0, B < 0

```
A=1;
B=-10;
ODE=x''[t]+A/x[t]^2-B/x[t]^3==0;
sol=NDSolve[{ODE,x[0]==1,x'[0]==1},x[t],{t,-10,10}]
Plot[x[t]/.sol,{t,-10,10}]
```

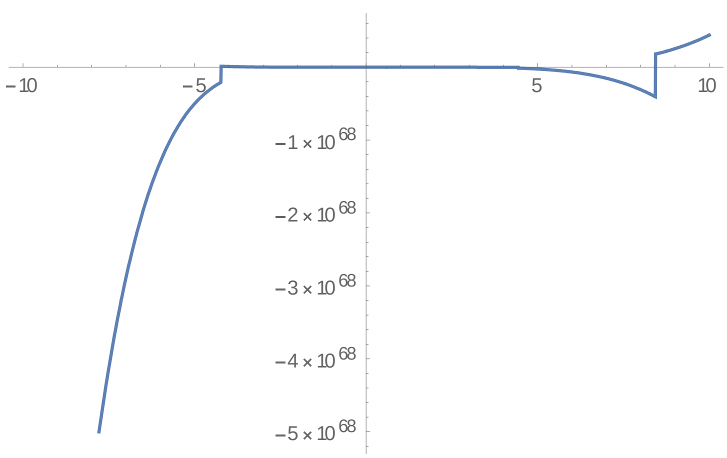

Figure 2. Plot of Ermakov-type solution for A=1, B=-10

From the above numerical experiments, we conclude that the evolution of the Universe depends on the constants involved, especially on the rotational-vortex structure of the Universe. This needs to be investigated in more detailed for sure.

One conclusion that we may derive especially from Figure 2, is that our computational simulation suggests that it is possible to consider that the Universe has existed for long time in prolonged stagnation period, then suddenly it burst out from *empty and formless* (Gen. 1:2), to take its current shape with accelerated expansion.

As an implication, we may arrive at a precise model of flattening velocity of galaxies without having to invoke *ad-hoc* assumptions such as dark matter.

Therefore, it is perhaps noteworthy to discuss briefly a simple model of galaxies based on a postulate of turbulence vortices which govern the galaxy dynamics. The result of Vatistas' model equation can yield prediction which is close to observation, as shown in the following diagram:[14]

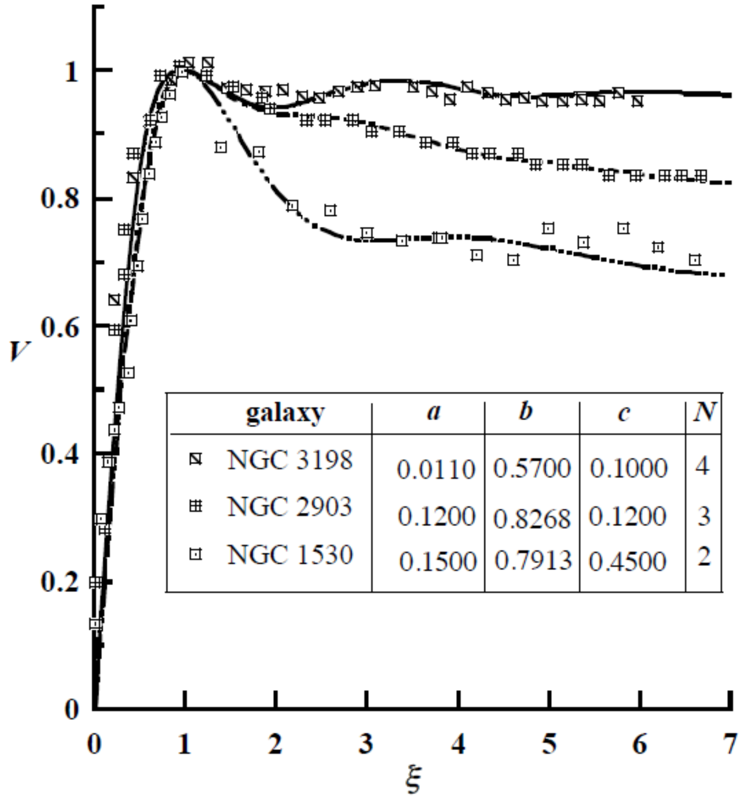

Figure 3. From Vatistas [14]

Therefore it appears possible to model galaxies without invoking numerous *ad hoc* assumptions such as *dark matter*, once we accept the existence of turbulent interstellar medium. The Vatistas model is also governed by Navier-Stokes equations, see for instance [14].

b. *How "turbulence-generated sound" can be put into a mathematical model for the early Universe*

We are aware that the notion of turbulence-generated sound is not new term at all especially in aerodynamics, but the term is rarely used in cosmology until now. We will consider some papers where it can be shown that 3D Navier-Stokes will lead to non-linear acoustics models, which means that a turbulence/storm can generate sound wave.

In this section we consider only two approaches:

- Shugaev-Cherkasov-Solenaya's model: They investigate acoustic radiation emitted by three-dimensional (3D) vortex rings in air on the basis of the unsteady Navier–Stokes equations. Power series expansions of the unknown functions with respect to the initial vorticity which is supposed to be small are used. In such a manner the system of the Navier–Stokes equations is reduced to a parabolic system with constant coefficients at high derivatives. [16]
- Rozanova-Pierrat's Kuznetsov equation: she analysed the existing derivation of the models of non-linear acoustics such as the Kuznetsov equation, the NPE equation and the KZK equation. The technique of introducing a corrector in the derivation ansatz allows to consider the solutions of these equations as approximations of the solution of the initial system (a compressible Navier-Stokes/Euler system). The direct derivation shows that the Kuznetzov equation is the first order approximation of the Navier-Stokes system, the KZK and NPE equations are the first order approximations of the Kuznetzov equation and the second order approximations of the Navier-Stokes system. [17]

4. Vortex-sound theory and fluidic Maxwell equations

There are a number of proposals to revise Maxwell equations. But few has considered a fresh starting point with regards to the (sub) structure of aether. It is very interesting to note that Prof. T. Kambe from University of Tokyo has made a connection between the equation of vortex-sound theory and its analogue fluid Maxwell equations. He wrote that it would be no exaggeration to say that any vortex motion excites *acoustic* waves. [2]

He considers the equation of vortex sound of the form: [2]

$$\frac{1}{c^2}\partial_t^2 p - \nabla^2 p = \rho_0 \nabla . L = \rho_0 div(\omega \times v) \tag{6}$$

He also wrote that dipolar emission by the vortex-body interaction is:[2]

$$p_F(x,t) = -\frac{P_0}{4\pi c}\dot{\Pi}_i(t-\frac{x}{c})\frac{x_c}{x^2} \tag{7}$$

Then he obtained an expression of fluid Maxwell equations as follows [2]:

$$
\begin{aligned}
&\nabla \cdot H = 0 \\
&\nabla \cdot E = q \\
&\nabla \times E + \partial_t H = 0 \\
&a_0^2 \nabla \times H - \partial_t E = J
\end{aligned} \tag{8}
$$

Where [2]:

a_0 denotes the sound speed, and

$$
\begin{aligned}
&q = -\partial_t (\nabla \cdot \upsilon) - \nabla \hbar, \\
&J = \partial_t^2 v + \nabla \partial_t h + a_o^2 \nabla \times (\nabla \times \upsilon)
\end{aligned} \tag{9}
$$

In our opinion, this new expression of fluid Maxwell equations suggests that there is a deep connection between vortex sound and electromagnetic fields.

However, it should be noted that the above expressions based on fluid dynamics need to be verified with experiments. We should note also that in (8) and (9), the speed of sound a_0 is analogous of the speed of light in Maxwell equations, whereas in equation (6), the speed of sound is designated "c" (as analogous to the light speed in EM wave equation).

As an added note, we can mention here that elsewhere Wang [5] was able to derive Coulomb law from the source-sink approach. We are wondering if it is also possible to re-derive Maxwell equations including displacement current from the same approach. If yes, then it may offer another fresh starting point to understand the physical meaning of displacement current.

5. Concluding remarks

In recent years, there is growing number of proposals to use a novel concept of singularity-free Cosmology models. It should be clear that if we are able to come up with such singularity-free models which agree well with observation data, then the Big Bang model is no longer required. Therefore, here we explore a few alternative stories other than Big Bang story, which most cosmologists believe it is the nearest to Biblical account of creation (as Fred Hoyle once remarked: the Big Bang is a fanatical religion).

We argue that a re-reading of Genesis 1:2 will lead us to another viable story, albeit the alternative has not been developed rigorously as LCDM theories.

It took around three years before now we have been thinking this problem out loud, and here our answer can be summarized as follows: "*The relic sound wave in early creation is a faithful interpretation of John 1:1, but we can come up with a more complete picture if we combine it with Gen. 1:2, that is the Holy Spirit came to hovering over the primordial fluid, then a kind of hurricane/storm started which created perfect medium where God spoke (Logos).*"
And one conclusion that we may derive especially from Figure 2, is that our computational simulation suggests that it is possible to consider that the Universe has existed for long time in prolonged stagnation period, then suddenly it burst out from *empty and formless (Gen. 1:2)*, to take its current shape which is accelerating. Such a possibility has never been considered before in cosmology literatures.
We also briefly discuss a plausible extension of Maxwell equations based on vortex sound theory of Prof. Tsutomu Kambe. It is our hope that our exploration will lead to nonlinear cosmology theories which are better in terms of observations, and also more faithful to Biblical account of creation.

Acknowledgment: The first author (VC) also would like to express his gratitude to Jesus Christ who always encouraged and empowered him in many occasions. He is the Good Shepherd. And special thanks to Dr. Joas Adiprasetya, Dr. Yonky Karman, and Dr. Wonsuk Ma for discussions on early creation of the Universe. We also thank to a number of professors in physics, including Prof. Liek Wilardjo and Prof. Thee Houw Liong. *Soli Deo Gloria!*

References

[1] James C. Maxwell. *On Physical Lines of Force*. 1861. http://vacuum-physics.com/Maxwell/maxwell_oplf.pdf

[2] Tsutomu Kambe. A new formulation of equations of compressible fluids by analogy with Maxwell equations. *Fluid Dyn. Res.* 42 (2010) 055502 (18pp). IOP Publ.

[3] Victor Christianto, Yunita Umniyati, Volodymyr Krasnoholovets. On Plausible Role of Classical Electromagnetic Theory and Submicroscopic Physics to understand and enhance Low Energy Nuclear Reaction (LENR): A Preliminary Review. *J. Cond. Matt. Nucl. Sci.,* April 2017. http://www.iscmns.org

[4] Marco Landini. About the Physical Reality of "Maxwell's Displacement Current" in Classical Electrodynamics. *Progress In Electromagnetics Research*, Vol. 144, 329-343, 2014

[5] Xiao-Song Wang. Derivation of Coulomb's Law of Forces Between Static Electric Charges Based on Spherical Source and Sink Model of Particles. arXiv: physics/0609099v2 [physics.gen-ph]

[6] Amos Yong. *The Spirit of Creation.* Cambridge: Wm. B. Eerdmans Publ. Co., 2011

[7] in the vale of soul-making. Url: http://themathesontrust.org/papers/modernity/sheldrake-vale.pdf

[8] Ildus S. Nurgaliev. *E pur si muove!* arXiv: 1210.4091. [8a] see also Singularities are averted by vortices. *13th Gravitational Conference – International Conference on Gravitation, Cosmology and Astrophysics*. June 23-28, 2008. Peoples Friendship University of Russia (PFUR), Moscow, Russia. Abstracts. Published by PFUR, ISBN 978-5-209-03274-8, pp. 117–118; [8b] Also in *Gravitation and Cosmology* vol. 16 no. 4 (2010) pp. 313-315.

[9] Victor Christianto & Florentin Smarandache & Yunita Umniyati. Solving Numerically Ermakov-type Equation for Newtonian Cosmology Model with Vortex. *Prespacetime Journal*, Oct. 2017. www.prespacetime.com

[10] V. Christianto "An Outline of Cosmology Based on Interpretation of the Johannine Prologue", *The Bulletin of Society for Mathematical Services and Standards,* Vol. 11, pp. 4-12, 2014. url: https://www.scipress.com/BSMaSS.11.4

[11] V. Christianto. An Outline of New Cosmology Model Inspired by Cosmic Christology of the Johannine Prologue. *Scientific GOD Journal*, Vol. 7 no. 4 (2016), url: http://www.scigod.com/index.php/sgj/article/view/468/518

[12] V. Christianto. A Comparative Study of Cosmology Revealed from Christology and Trinitarian Approaches. *Scientific GOD Journal*, Vol. 7 no. 6 (2016), url: http://www.scigod.com/index.php/sgj/article/view/486/528

[13] V. Christianto. A Theo-Cymatic Reading of Prolegomena of St. John's Gospel. *Scientific GOD Journal*, Vol. 8 no. 4 (2017), url: http://www.scigod.com/index.php/sgj/article/view/544/595

[14] Georgios Vatistas. The presence of interstellar turbulence could explain the velocity flattening in galaxies. arXiv: 1012.1384

[15] Wilf Hildebrandt. *An Old Testament Theology of the Spirit of God*. Peabody: Hendrickson Publsihers, Inc., 1995

[16] Fedor V. Shugaev, Dmitri Y. Cherkasov and Oxana A. Solenaya. Acoustic radiation by 3D vortex rings in air. *Aerospace* 2015, 2, 627-636; doi:10.3390/aerospace2040627

[17] Anna Rozanova-Pierrat. Approximation of a compressible Navier-Stokes system by non-linear acoustical models. arXiv: 1601.0558 (2016)

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VC & FS

A Newtonian-Vortex Cosmology Model from Solar System to Galaxy to Large Scale Structures: Navier-Stokes-Inspired Cosmography

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ABSTRACT

Some years ago, Matt Visser asked the following interesting questions: How much of modern cosmology is really cosmography? How much of modern cosmology is independent of the Einstein equations? (Independent of the Friedmann equations?) These questions are becoming increasingly germane — as the models cosmologists use for the stress-energy content of the universe become increasingly baroque. Therefore, in this paper we will discuss a novel Newtonian cosmology model with vortex, which offers wide implications from solar system, galaxy modeling up to large scale structures of the Universe. The basic starting point is very simple: It has been known for long time that most of the existing cosmology models have singularity problem. Cosmological singularity has been a consequence of excessive symmetry of flow, such as "Hubble's law." More realistic one is suggested, based on Newtonian cosmology model but here we include the vortical-rotational effect of the whole Universe. We review an Ermakov-type equation obtained by Nurgaliev, and solve the equation numerically with Mathematica. A potential application is also considered, namely for understanding tornado dynamics using 3D Navier-Stokes equations. It is our hope that the new proposed method can be verified with observations, in order to open new possibilities of more realistic nonlinear cosmology models.

Keywords: Ermakov-type equation, nonlinear cosmology, Newtonian cosmology, vortex dynamics, turbulence, Navier-Stokes equations, spiral galaxy

1. Introduction

Some years ago, Matt Visser asked the following interesting questions: How much of modern cosmology is really cosmography? How much of modern cosmology is independent of the Einstein equations? (Independent of the Friedmann equations?) These questions are becoming increasingly germane — as the models cosmologists use for the stress-energy content of the universe become increasingly *baroque*. [5]

In this regard, academician Isaak Khalatnikov mentioned at the 13th Marcel Grossman Conference[1], that Lev Landau suggesting that something is too symmetric in the models yielding singularities, and that this problem is one of the three most important problems of modern physics. The aim of this report is to show that singularities are, indeed, consequences of such an overly "symmetrical approach" in building non-robust (i.e. without structural stability) toy models with singularities. Such models typically apply a synchronous system of reference and "Hubble's law", neglecting not-to-be-averaged-out quadratic terms of perturbations (specifically, differentially rotational velocities, vortexes).[1]

Only by accounting the overlooked factors instead of Einstein's ad hoc introduction of a new entity, which was later declared by him as his "biggest blunder", can we correctly interpret accelerated cosmological expansion, as well as provide possibility of static solution. The common perception of the observed accelerated expansion is that there is need either in modifying the General Relativity or discover new particles with unusual properties. Interestingly enough, both ways are possible depending on what kind of system of reference and corresponding interpretation are chosen, a decision which is usually made depending on the level of *"geometrization*."[1]

Local rotations (vortices) play a role in radical stabilization of the cosmological singularity in the retrospective extrapolation, making possible a static or steady-state

[1] http://www.icra.it/mg/mg13/

(on the average) Universe or local region. Therefore Einstein could "permit" the galaxies to rotate instead of postulating a cosmological constant *ad hoc* in his general-relativistic consideration of a static Universe. Though, it does not necessarily mean that the cosmological constant is not necessary for other arguments.[2]

In this paper, more realistic one is suggested, based on Newtonian cosmology model but here we include the vortical-rotational effect of the whole Universe. We review an Ermakov-type equation obtained by Nurgaliev [1][2], and solve the equation numerically with Mathematica 11.

In this paper we will also discuss a novel Newtonian cosmology model with vortex, which offers wide implications from solar system, galaxy modeling up to large scale structures of the Universe.

It is our hope that the new proposed method can be verified with observation data.

2. A few historical notes

Since long time ago, there were numerous models of the Universe, dating back to Ptolemaic geocentric model, which was subsequently replaced by Nicolas Copernicus discovery. Copernicus model then was brought into fame after Isaac Newton published his book. But other than Newton, there was a model of Universe as a turbulent fluid (hurricane) brought by a French philosopher and mathematician, R. Descartes. But, this model was almost forgotten. Many physicists rejected Descartes' model because it stood against Newtonian model, but the truth is turbulence model can be expressed in Navier-Stokes equations, and Navier-Stokes equations can be considered as the rigorous formulation of Newtonian laws, especially for fluid dynamics. In other words, we can say that Newtonian turbulence Universe is not in direct contradiction with Newtonian laws. Therefore, in this paper we submit wholeheartedly a proposal that the Universe can be modelled as Newtonian-Vortex based on 3D Navier-Stokes equations. We shall show some implications of this new model in the following sections.

3. Solar System model

In this section, we will review the work which was carried out by VC and FS during the past ten years or so. The basic assumption here is that the Solar System's planetary orbits are quantized. But how do their orbits behave? Do they follow Titius-Bode's law? Our answer can be summarized as follows:[6][7][8]

Navier-Stokes equations → superfluid quantized vortices → Bohr's quantization

Our predictive model based on that scheme has yielded some interesting results which may be comparable with the observed orbits of planetoids beyond Pluto, including what is dubbed as Sedna.[9] And it seems that the proposed model is slightly better compared to Nottale-Schumacher's gravitational Schrödinger model and also Titius-Bode's empirical law.

4. Spiral Galaxy model

In this section, we discuss a simple model of galaxies based on a postulate of turbulence vortices which govern the galaxy dynamics. Abstract of Vatistas' paper told clearly:[10]

> Expanding our previous work on turbulent whirls [1] we have uncovered a similarity within the similarity shared by intense vortices. Using the new information we compress the tangential velocity profiles of a diverse set of vortices into one and thus identify those that belong to the same genus. Examining the Laser Doppler Anemometer (LDA) results of mechanically produced vortices and radar data of several tropical cyclones, we find that the uplift and flattening effect of tangential velocity is a consequence of turbulence. Reasoning by analogy we conclude that turbulence in the interstellar medium could indeed introduce a flattening effect in the galactic rotation curves.

The result of his model equation can yield prediction which is close to observation

(without invoking dark matter hypothesis), as shown in the following diagram:

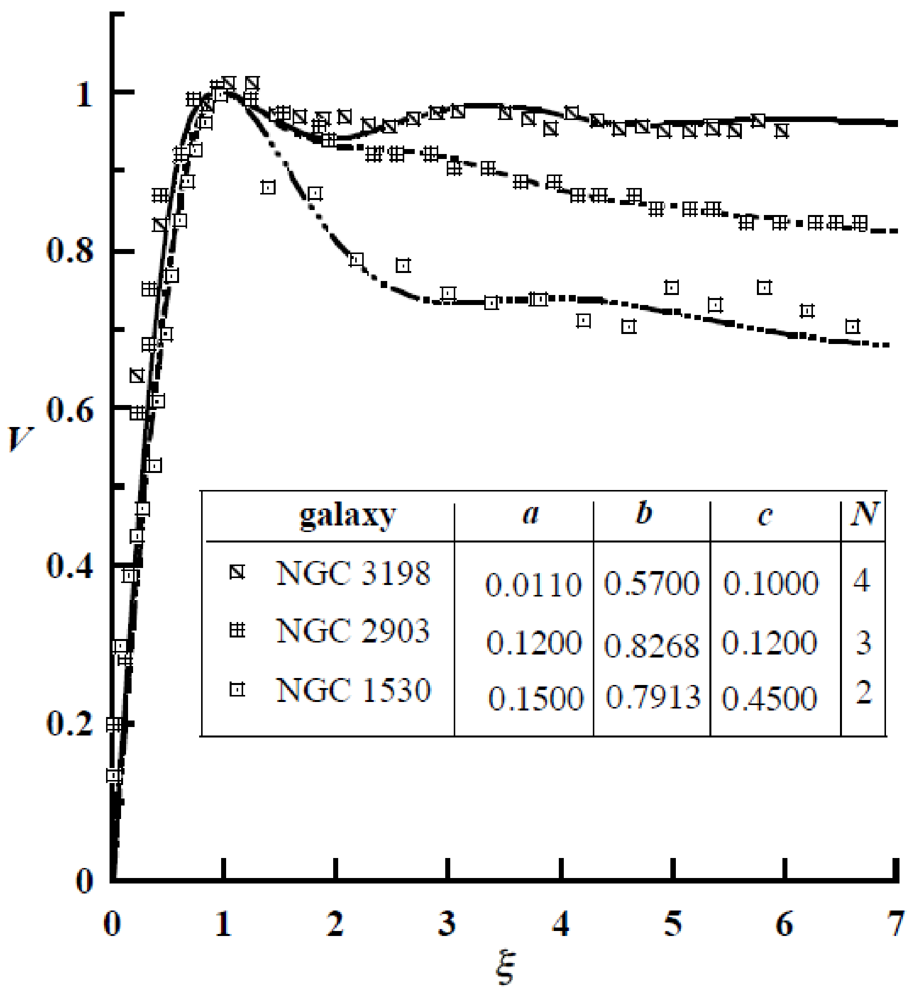


Diagram 1. From Vatistas [10]

Therefore it appears possible to model galaxies without invoking numerous *ad hoc* assumptions, once we accept the existence of turbulent interstellar medium. The model is also governed by Navier-Stokes equations.[10]

5. Deriving Ermakov-type equation for Newtonian Universe with vortex

It has been known for long time that most of the existing cosmology models have *singularity* problem. Cosmological singularity has been a consequence of excessive symmetry of flow, such as "Hubble's law". A more realistic one is suggested, based on Newtonian cosmology model but here we include the vortical-rotational effect of the whole Universe.

In this section, we will derive an Ermakov-type equation following Nurgaliev [1]. Then we will solve it numerically using Mathematica 11.

After he proceeds with some initial assumptions, Nurgaliev obtained a new simple local cosmological equation:[2]

$$\dot{H} + H^2 = \omega^2 + \frac{4\pi G}{3}\rho, \qquad (1)$$

where $\dot{H} = dH/dt$. Here, H, G, ω and ρ stand for Hubble constant, Newtonian gravitational constant, angular speed, and density, respectively.

The angular momentum conservation law ωR^2 = const = K and the mass conservation law $(4\pi/3)\rho R^3$ = const = M makes equation (1) solvable:[2]

$$\dot{\mathrm{H}} + \mathrm{H}^2 = \frac{K^2}{R^4} - \frac{\mathrm{GM}}{\mathrm{R}^3}, \qquad (2)$$

or

$$\ddot{R} = \frac{K^2}{R^3} - \frac{GM}{R^2}. \tag{3}$$

Equation (3) may be written as Ermakov-type nonlinear equation as follows;

$$\ddot{R} + \frac{GM}{R^2} = \frac{K^2}{R^3}. \tag{4}$$

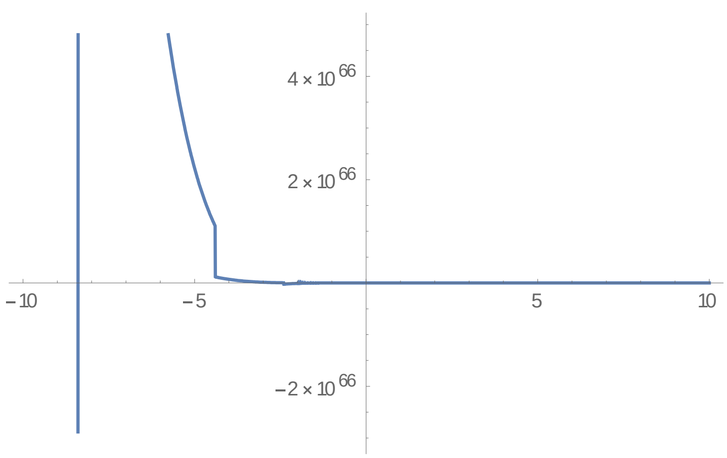
Nurgaliev tried to integrate equation (3), but now we will solve the above equation with Mathematica 11. First, we will rewrite this equation by replacing GM=A, K^2=B, so we get:

$$\ddot{R} + \frac{A}{R^2} = \frac{B}{R^3}. \tag{5}$$

As with what Nurgaliev did in [1][2], we also tried different sets of A and B values, as follows:

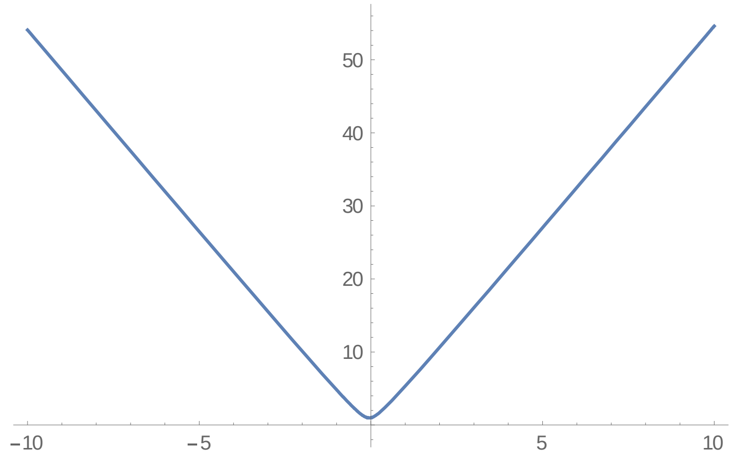
a. A and B < 0

```
A=-10;
B=-10;
ODE=x''[t]+A/x[t]^2-B/x[t]^3==0;
sol=NDSolve[{ODE,x[0]==1,x'[0]==1},x[t],{t,-10,10}]
Plot[x[t]/.sol,{t,-10,10}]
```



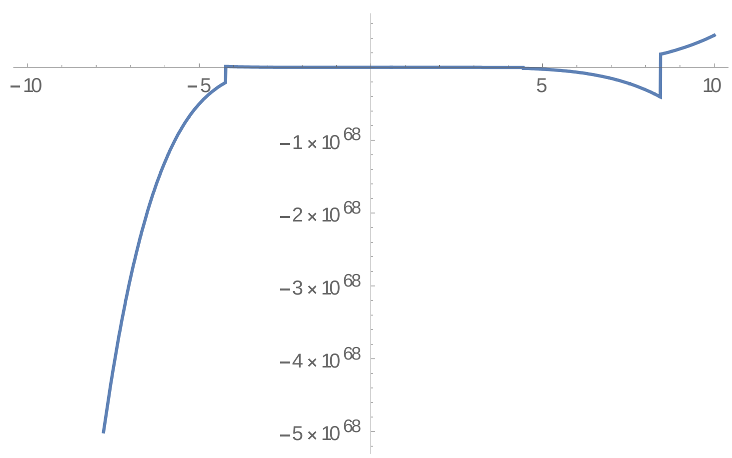
b. A < 0, B > 0

```
A=-10;
B=10;
ODE=x''[t]+A/x[t]^2-B/x[t]^3==0;
sol=NDSolve[{ODE,x[0]==1,x'[0]==1},x[t],{t,-10,10}]
Plot[x[t]/.sol,{t,-10,10}]
```



c. A > 0, B < 0

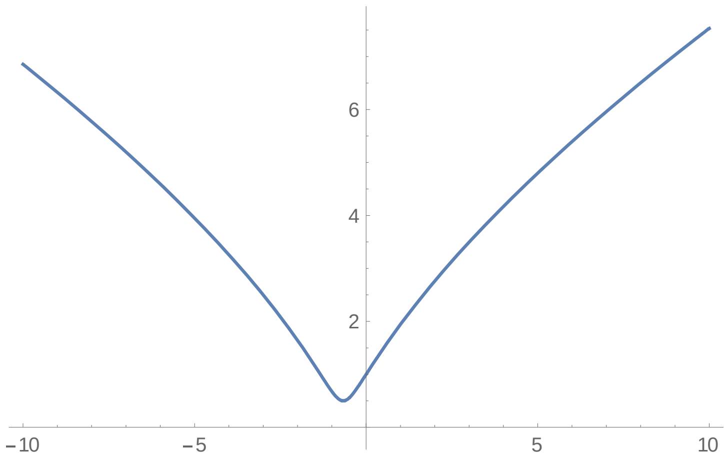
```
A=1;
B=-10;
ODE=x''[t]+A/x[t]^2-B/x[t]^3==0;
sol=NDSolve[{ODE,x[0]==1,x'[0]==1},x[t],{t,-10,10}]
Plot[x[t]/.sol,{t,-10,10}]
```



d. A >0, B > 0

```
A=1;
B=1;
ODE=x''[t]+A/x[t]^2-B/x[t]^3==0;
sol=NDSolve[{ODE,x[0]==1,x'[0]==1},x[t],{t,-10,10}]
```

Plot[x[t]/.sol,{t,-10,10}]



From the above numerical experiments, we conclude that the evolution of the Universe depends on the constants involved, especially on the rotational-vortex structure of the Universe. This needs to be investigated in more detailed for sure.

6. Engineering application: Hurricane dynamics and solution of 3D Navier-Stokes

Various methods to describe hurricane dynamics have been proposed in the literature, but most of them are based on 3D Navier-Stokes. Some existing models of tornado dynamics can be found in [11][12].

Now, we will discuss a simplified numerical solution of 3D Navier-Stokes equations based on Sergey Erhskov's papers [13][14].

In fluid mechanics, there is an essential deficiency of the analytical solutions of Navier–Stokes equations for 3D case of non-stationary flow. The Navier-Stokes system of equations for incompressible flow of Newtonian fluids should be presented in the Cartesian coordinates as below (under the proper initial conditions):[13]

$$\nabla.\vec{u} = 0, \qquad (6)$$

$$\frac{\partial \vec{u}}{\partial t} + (\vec{u} \cdot \nabla)\vec{u} = -\frac{\nabla p}{\rho} + \nu \cdot \nabla^2 \vec{u} + \vec{F}, \tag{7}$$

where u is the flow velocity, a vector field; ρ is the fluid density, p is the pressure, v is the kinematic viscosity, and F represents external force (per unit mass of volume) acting on the fluid.[13]

In ref. [13], Ershkov explores the ansatz of derivation of non-stationary solution for the Navier–Stokes equations in the case of incompressible flow, which was suggested earlier. In general case, such a solution should be obtained from the mixed system of 2 coupled Riccati ordinary differential equations (in regard to the time-parameter t). But instead of solving the problem analytically, we will try to find a numerical solution.

The coupled Riccati ODEs read as follows:[13]

$$a' = \frac{w_y}{2} \cdot a^2 - (w_x \cdot b) \cdot a - \frac{w_y}{2}(b^2 - 1) + w_z \cdot b, \tag{8}$$

$$b' = -\frac{w_x}{2} \cdot b^2 - (w_y \cdot a) \cdot b - \frac{w_x}{2}(a^2 - 1) + w_z \cdot a. \tag{9}$$

First, equations (8) and (9) can be rewritten in the form as follows:

$$x(t)' = \frac{v}{2} \cdot x(t)^2 - (u \cdot y(t)) \cdot x(t) - \frac{v}{2}(y(t)^2 - 1) + w \cdot y(t), \tag{10}$$

$$y(t)' = -\frac{u}{2} \cdot y(t)^2 - (v \cdot x(t)) \cdot y(t) - \frac{u}{2}(x(t)^2 - 1) + w \cdot x(t). \tag{11}$$

Then we can put the above equations into Mathematica expression:[3]

```
v=1;
u=1;
w=1;
{xans6[t_], vans6[t_]}=
```

```
{x[t],y[t]}/.Flatten[NDSolve[{x'[t]==(v/2)*x[t]^2-(u*y[t])*x[t]-(v/2)*(y[t]^2-1)+w*y[t], y'[t]==-(u/2)*y[t]^2-(v*x[t])*y[t]-(u/2)*(x[t]^2-1)+w*x[t], x[0]==1,y[0]==0}, {x[t],y[t]},{t,0,10}]]

graphx6 = Plot[xans6[t],{t,0,10}, AxesLabel->{"t","x"},PlotStyle->Dashing[{0.02,0.02}]];
Show[graphx6,graphx6]
```

The result is as shown below:[3]

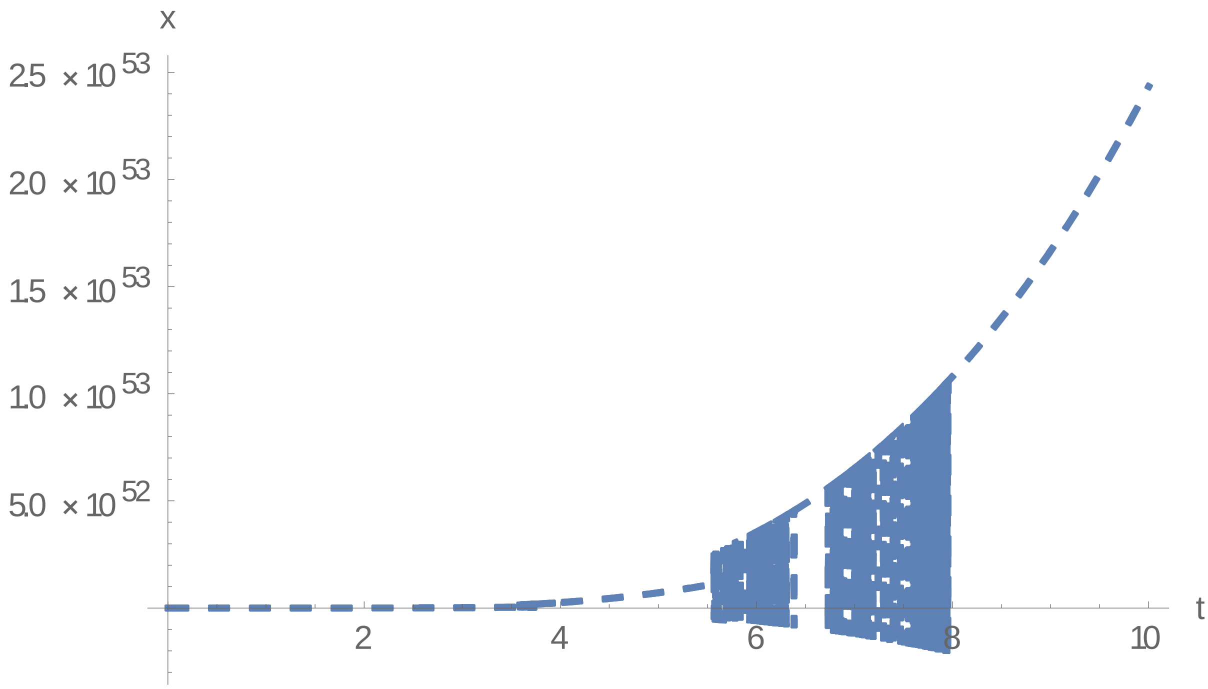


DIAGRAM 2. Graphical plot of solution for case v=u=w=1. See [3]

It is our hope that the above numerical solution of 3D Navier-Stokes equations can be found useful for engineering purposes, such as controlling large tornadoes which happen quite often in various regions each year.

7. Concluding Remarks

It has been known for long time that most of the existing cosmology models have singularity problem. Cosmological singularity has been a consequence of excessive symmetry of flow, such as “Hubble’s law”. More realistic one is suggested, based on Newtonian cosmology model but here we include the vortical-rotational effect of the whole Universe. We discuss a plausible model for describing planetary quantization in Solar system and also flattening velocity observed in numerous galaxies. We also review a Riccati-type equation obtained by Nurgaliev, and solve the equation numerically with Mathematica 11.

We also discuss an engineering application of this model, i.e. how to solve 3D Navier-Stokes equations numerically. It is our hope that the above numerical solution of 3D Navier-Stokes equations can be found useful for engineering purposes, such as controlling large hurricanes which happen quite often in various regions each year.

The solutions obtained here opens up new ways to interpret existing solutions of known 3D Navier-Stokes problem in physics, astrophysics, cosmology and engineering fields, especially those associated with nonlinear hydrodynamics and turbulence modelling.

It is our hope that the new proposed Cosmology model with vortex can be verified with more extensive observation data.

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References:

[1] Ildus S. Nurgaliev. *E pur si muove!* arXiv: 1210.4091. [1a] see also Singularities are averted by vortices. *13th Gravitational Conference – International Conference on Gravitation, Cosmology and Astrophysics*. June 23-28, 2008. Peoples Friendship University of Russia (PFUR), Moscow, Russia. Abstracts. Published by PFUR, ISBN 978-5-209-03274-8, pp. 117–118; [1b] Also in *Gravitation and Cosmology* vol. 16 no. 4 (2010) pp. 313-315.

[2] Victor Christianto & Florentin Smarandache & Yunita Umniyati. Solving Numerically Ermakov-type Equation for Newtonian Cosmology Model with Vortex. Submitted to *Prespacetime Journal*, Aug. 2017. www.prespacetime.com

[3] Victor Christianto & Sergey V. Ershkov. Solving Numerically a System of Coupled Riccati ODEs for Incompressible Non-Stationary 3D Navier-Stokes Equations. Paper presented in *ISCPMS*, 26th July 2017. url: http://iscpms.ui.ac.id

[4] Victor Christianto & Florentin Smarandache. A Computer Algebra Solution of Ermakov Equation Corresponding to Diffusion Interpretation of Wave Mechanics. Submitted to *Prespacetime Journal*, aug 2017.

[5] Matt Visser. Cosmography: Cosmology without Einstein equations. General Relativity and Gravitation, Nov. 2004. arXiv: gr-qc/0411131

[6] Victor Christianto. A Cantorian Superfluid Vortex and the Quantization of Planetary motion. *Apeiron* Vol. 11, No. 1, January 2004. Url: http://redshift.vif.com/JournalFiles/V11NO1PDF/V11N1CHR.pdf

[7] Victor Christianto. Comparison of Predictions of Planetary Quantization and Implications of the Sedna Finding. *Apeiron* Vol. 11 No. 3, July 2004. Url: https://www.researchgate.net/publication/228393806_Comparison_of_Predictions_of_Planetary_Quantization_and_Implications_of_the_Sedna_Finding

[8] Victor Christianto. On the origin of macroquantization in astrophysics and celestial motion. *Annales de la Fondation Louis de Broglie* Vol. 31 No. 1, 2006. url: https://www.researchgate.net/publication/240305621_On_the_origin_of_macroquantization_in_astrophysics_and_celestial_motion

[9] Victor Christianto & Florentin Smarandache. 2005. On recent discovery of new planetoids in the solar system and quantization of celestial system. Url: http://www.gallup.unm.edu/~smarandache/ScArt6/RecentDiscoveryPlanetoids.pdf

[10] Georgios Vatistas. The presence of interstellar turbulence could explain the velocity flattening in galaxies. arXiv: 1012.1384

[11] M. Larcheveque & J. Chaskalovic. A new mathematical model applied to tornado genesis. *Int. J. Engng. Sci*. Vol. 32 no. 1, pp. 187-193 (1994)

[12] J. Chaskalovic & A. Chauviere. Appearance of a source/sink line into a swirling vortex. Math. Model and Methods in Appl. Sci. *Vol. 13 no. 1 (2003) 121-142.*

[13] Sergey V. Ershkov. Non-stationary Riccati-type flows for incompressible 3D Navier–Stokes equations. *Computers and Mathematics with Applications* **71**, 1392–1404 (2016)

[14] Sergey V. Ershkov. A procedure for the construction of non-stationary Riccati-type flows for incompressible 3D Navier–Stokes Equations. *Rend. Circ. Mat. Palermo* **65**:73–85 (2016)

[15] I. Shingareva & Carlos Lizarraga-Celaya. *Solving Nonlinear Partial Differential Equations with Maple and Mathematica*. Dordrecht : Springer, 2011. 371 p.

[16] Patrick T. Tam. *A Physicist's guide to Mathematica*. 2nd ed. Amsterdam: Academic Press - an imprint of Elsevier, 2008. 749 p.

[17] L.D. Landau, E.M. Lifshitz, *Fluid mechanics, Course of Theoretical Physics 6*, 2nd revised ed., Pergamon Press, 1987. ISBN: 0-08-033932-8

[18] O. Abu Arqub, Numerical solutions for the Robin time-fractional partial differential equations of heat and fluid flows based on the reproducing kernel algorithm, *International Journal of Numerical Methods for Heat & Fluid Flow* (2017). doi:10.1108/HFF-07-2016-0278.

[19] O. Abu Arqub, Fitted reproducing kernel Hilbert space method for the solutions of some certain classes of time-fractional partial differential equations subject to initial and Neumann boundary conditions, *Computers & Mathematics with Applications* 73 (2017) 1243-1261.

[20] O. Abu Arqub, A. El-Ajou, S. Momani, Constructing and predicting solitary pattern solutions for nonlinear time-fractional dispersive partial differential equations, *Journal of Computational Physics* 293 (2015) 385-399.

Revision history:

7 dec 2017

A list of changes for each point which is being raised

1. 3 new references are added according to reviewer's suggestion.

2. A historical note has been added (section 2)

3. numeration of all of the equations appear in the paper.

4. Define the used symbols clearly throughout the paper.

5. punctuation marks have been checked through the paper, especially after the equations

Solving Numerically Ermakov-type Equation for Newtonian Cosmology Model with Vortex[1]

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ABSTRACT

It has been known for long time that most of the existing cosmology models have singularity problem. Cosmological singularity has been a consequence of excessive symmetry of flow, such as "Hubble's law". More realistic one is suggested, based on Newtonian cosmology model but here we include the vertical-rotational effect of the whole Universe. We review a Riccati-type equation obtained by Nurgaliev, and solve the equation numerically with Mathematica. It is our hope that the new proposed method can be verified with observation data.

Keywords: Riccati-type equation, computational physics, nonlinear cosmology, Newtonian cosmology, vortex.

1. Introduction

It has been known for long time that most of the existing cosmology models have singularity problem. Cosmological singularity has been a consequence of excessive symmetry of flow, such as "Hubble's law."

In this regard, academician Isaak Khalatnikov mentioned at the 13th Marcel Grossman Conference (http://www.icra.it/mg/mg13/) Lev Landau suggesting that something is too symmetric in the models yielding singularities, and that this problem is one of the three most important problems of modern physics. The aim of this report is to show that

[1] This paper is dedicated for 72th anniversary of Indonesia's Independence Day, 17 august 2017.

singularities are, indeed, consequences of such an overly “symmetrical approach” in building non-robust (i.e. without structural stability) toy models with singularities. Such models typically apply a synchronous system of reference and “Hubble’s law”, neglecting not-to-be-averaged-out quadratic terms of perturbations (specifically, differentially rotational velocities, vortexes).[1]

Only by accounting the overlooked factors instead of Einstein’s ad hoc introduction of a new entity, which was later declared by him as his “biggest blunder”, can we correctly interpret accelerated cosmological expansion, as well as provide possibility of static solution. The common perception of the observed accelerated expansion is that there is need either in modifying the General Relativity or discover new particles with unusual properties. Interestingly enough, both ways are possible depending on what kind of system of reference and corresponding interpretation are chosen, a decision which is usually made depending on the level of “geometrization.”[1]

Local rotations (vortices) play a role in radical stabilization of the cosmological singularity in the retrospective extrapolation, making possible a static or steady-state (on the average) Universe or local region. Therefore Einstein could “permit” the galaxies to rotate instead of postulating a cosmological constant ad hoc in his general-relativistic consideration of a static Universe. Though, it does not necessarily mean that the cosmological constant is not necessary for other arguments.[2]

In this paper, more realistic one is suggested, based on Newtonian cosmology model but here we include the vortical-rotational effect of the whole Universe.

We review a Riccati-type equation obtained by Nurgaliev, and solve the equation numerically with Mathematica. It is our hope that the new proposed method can be verified with observation data.

2. Deriving Ermakov-type equation for Newtonian Cosmology model

In this section, we will derive a Riccati-type equation following Nurgaliev [1]. Then we will solve it numerically using Mathematica 11.

After he proceeds with some initial assumptions, Nurgaliev obtained a new simple local cosmological equation:[2]

$$\dot{H} + H^2 = \omega^2 + \frac{4\pi G}{3}\rho, \tag{1}$$

Where $\dot{H} = dH/dt$.

The angular momentum conservation law ωR^2 = const = K and the mass conservation law $(4\pi/3)\rho R^3$ = const = M makes equation (1) solvable:[2]

$$\dot{\mathrm{H}} + \mathrm{H}^2 = \frac{K^2}{R^4} - \frac{\mathrm{GM}}{\mathrm{R}^3}, \tag{2}$$

Or

$$\ddot{R} = \frac{K^2}{R^3} - \frac{GM}{R^2}. \tag{3}$$

Equation (3) may be written as Ermakov-type nonlinear equation as follows;

$$\ddot{R} + \frac{GM}{R^2} = \frac{K^2}{R^3}. \tag{4}$$

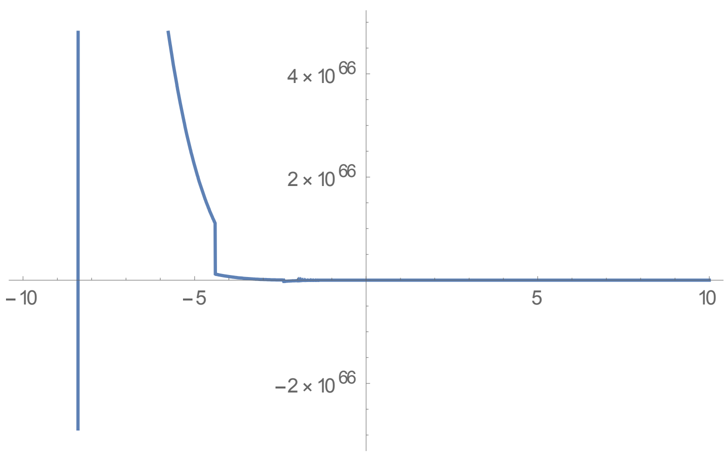
Nurgaliev tried to integrate equation (3), but now we will solve the above equation with Mathematica 11. First, we will rewrite this equation by replacing GM=A, K^2=B, so we get:

$$\ddot{R} + \frac{A}{R^2} = \frac{B}{R^3}. \tag{5}$$

As with what Nurgaliev did in [1][2], we also tried different sets of A and B values, as follows:

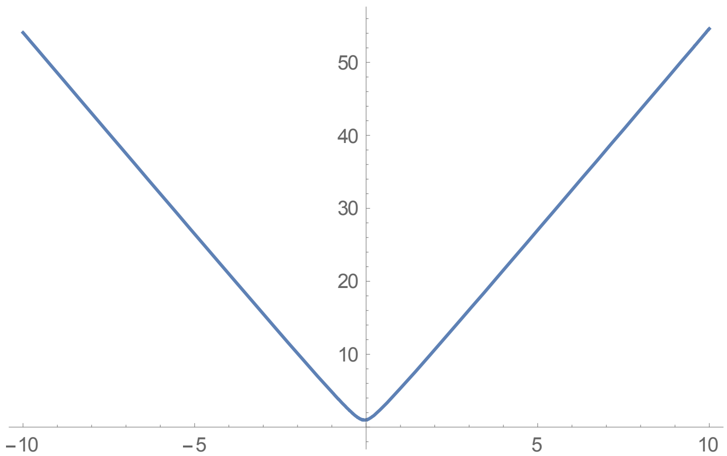
a. A and B < 0

```
A=-10;
B=-10;
ODE=x''[t]+A/x[t]^2-B/x[t]^3==0;
sol=NDSolve[{ODE,x[0]==1,x'[0]==1},x[t],{t,-10,10}]
Plot[x[t]/.sol,{t,-10,10}]
```



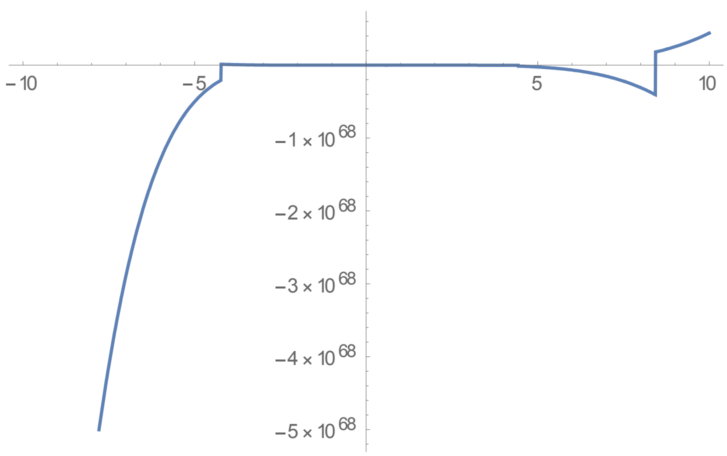
b. A < 0, B > 0

```
A=-10;
B=10;
ODE=x''[t]+A/x[t]^2-B/x[t]^3==0;
sol=NDSolve[{ODE,x[0]==1,x'[0]==1},x[t],{t,-10,10}]
Plot[x[t]/.sol,{t,-10,10}]
```



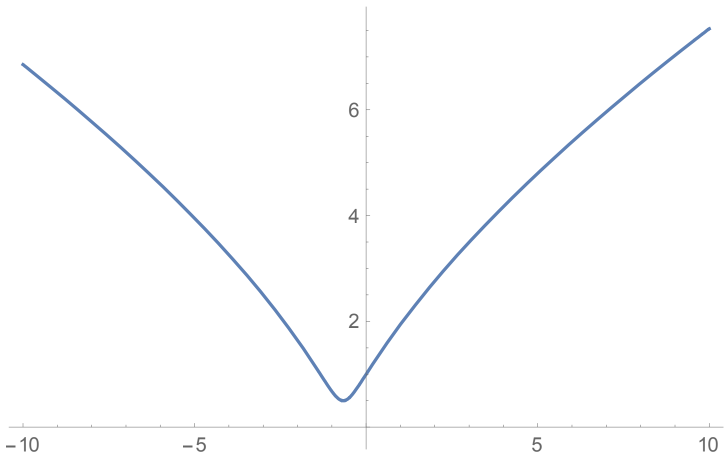
c. A > 0, B < 0

```
A=1;
B=-10;
ODE=x''[t]+A/x[t]^2-B/x[t]^3==0;
sol=NDSolve[{ODE,x[0]==1,x'[0]==1},x[t],{t,-10,10}]
Plot[x[t]/.sol,{t,-10,10}]
```



d. A >0, B > 0

```
A=1;
B=1;
ODE=x''[t]+A/x[t]^2-B/x[t]^3==0;
sol=NDSolve[{ODE,x[0]==1,x'[0]==1},x[t],{t,-10,10}]
Plot[x[t]/.sol,{t,-10,10}]
```



From the above numerical experiments, we conclude that the evolution of the Universe depends on the constants involved, especially on the rotational-vortex structure of the Universe. This needs to be investigated in more detailed for sure.

3. Concluding Remarks

It has been known for long time that most of the existing cosmology models have singularity problem. Cosmological singularity has been a consequence of excessive symmetry of flow, such as “Hubble’s law”. More realistic one is suggested, based on Newtonian cosmology model but here we include the vertical-rotational effect of the whole Universe. We review a Riccati-type equation obtained by Nurgaliev, and solve the equation numerically with Mathematica 11. It is our hope that the new proposed method can be verified with observation data.

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References:

[1] Ildus S. Nurgaliev. *E pur si muove!* arXiv: 1210.4091

[2] _______. Singularities are averted by vortices. *13th Gravitational Conference – International Conference on Gravitation, Cosmology and Astrophysics*. June 23-28, 2008. Peoples Friendship University of Russia (PFUR), Moscow, Russia. Abstracts. Published by PFUR, ISBN 978-5-209-03274-8, pp. 117–118; [2a] Also in *Gravitation and Cosmology* vol. 16 no. 4 (2010) pp. 313-315.

[3] Victor Christianto & Sergey V. Ershkov. Solving Numerically a System of Coupled Riccati ODEs for Incompressible Non-Stationary 3D Navier-Stokes Equations. Paper presented in *ISCPMS*, 26th July 2017. url: http://iscpms.ui.ac.id

[4] Victor Christianto & Florentin Smarandache. A Computer Algebra Solution of Ermakov Equation Corresponding to Diffusion Interpretation of Wave Mechanics. Submitted to *Prespacetime Journal*, aug 2017.

[5] William T. Reid. *Riccati Differential Equations*. New York: Academic Press Inc., 1972

A Theo-Cymatic reading of Prolegomena of St. John's Gospel: And Implications for Cosmology etc.

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Abstract

The science of cymatics, the study of visible sound, is beginning to yield clues to one of the most challenging questions in science: what triggered the creation of life on earth? The hypothetical model we have developed was inspired by ancient traditions and demonstrates that sound and cymatic forces could have worked together to become the dynamic force that created the first stirrings of life and also the Universe.

Guiding Text: John 1:1-5

1. In the beginning was the Word, and the Word was with God, and the Word was God.

2 The same was in the beginning with God.

3 All things were made by him; and without him was not any thing made that was made.

4 In him was life; and the life was the light of men.

5 And the light shineth in darkness; and the darkness comprehended it not.

Prologue

Spiritual traditions from many cultures speak of sound as having been responsible for the creation of life.

For instance, the Celts of old believed that the world was upheld and sustained by a single all-embracing melody: "Oran Môr," they called it, the Great Music, and all creation was part of it. Perhaps this is why Celtic music possesses the power to move us in unexpected ways - it touches

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that place deep in our hearts where legends still live, and we hear again the strains of the Ancient Song. (Stephen R. Lawhead, 1996) See Ref. (2).

The words of St.John's gospel are also a good example:(3)

"In the beginning the Word already existed. The Word was with God, and the Word was God." ['Word' meaning 'sound']

The science of cymatics, the study of visible sound, is beginning to yield clues to one of the most challenging questions in science: what triggered the creation of life on earth? The hypothetical model we have developed was inspired by ancient traditions and demonstrates that sound and cymatic forces could have worked together to become the dynamic force that created the first stirrings of life and also the Universe.(3)

The proposed model discussed herein may resonate with the concept of harmony of the spheres as outlined in Johannes Kepler's first monumental work: "*Mysterium Cosmographicum*."(22)

A theo-cymatic interpretation of John 1:1

Cosmic Christology is a basic Christian doctrine that was often debated during the past 40 years. Cosmic Christology is deeply related with the Cosmic Christ who is the universal but inclusive Savior. (6)

The biblical teaching on Cosmic Christology was a legacy of the faith of the Early Church, and this teaching was told in Jesus hymn in the Johannine prologue and the prologue of St. Paul's letter to Colossians (John 1:1-18; Col. 1:15-20), see also Christ hymn in letter to Philippians 2:6-

11.

Besides, there are also some texts which were often cited from the Old Testament; these texts indicate the personified Wisdom of God, who acts as the agent of creation. And this character was then used for Jesus Christ. (Proverbs 8:22-31; Wisdom of Solomon 8:4-6; Sirakh 1:4-9). There are also extra-biblical sources which can be referred to, such as "the Son of God" text of Qumran (Bereh di El, 4Q246). Such a text indicates that there was a kind of messianic hope of Essene people, and that hope was very close to the faith of Early Church toward Jesus Christ.

Several implications

That is why, one of my focus of research in the past 3 years until now was to find implications of Cosmic Christology in the context of physics and cosmology. That idea was motivated by the fact that there has been a serious tension between science and theology, after they were separated especially since Galileo Galilei was put into isolation by the Church. One of the books which has inspired me was by Tollefsen which discusses Christocentric Cosmology. See Thorstein Theodor Tollefsen: The Christocentric Cosmology of St. Maximus the Confessor (8).

My investigation has led to several hypotheses, five of them will be discussed shortly below:

(a) Jesus Christ is the Word of God, and He is the agent of God during the creation of the Universe. Because word means voice, and voice means sound, and sound means wave and frequency, then this thought led us to a hypothesis of the existence of primordial sound in the early time of creation (6). It is known by many cosmologists that there is abundance of relic cosmic sound wave from early epoch of creation. Perhaps such a primordial sound will be verified later by Cosmic microwave background radiation observation (CMBR). See for example

(11).

(b) another thought is that (electromagnetic) wave and frequency are very influential to begin each life of creatures. It appears that such a hypothesis was supported by experiments carried out by Prof. Luc Montagnier et al on the wave nature of DNA; (13)(14).

(c) that tought on the wave nature of the Universe also led to a wave model of superconductor electrodynamics. In physics, conductor is matter which can transmit electric current, while superconductor is matter which can transmit electric current at zero resistance. My hypothesis on superconductor electrodynamics has been discussed in a paper published last year in IJET (10);

(d) frequency may also be used to develop a novel approach of cancer therapy (12).

(e) the light particle which was dubbed as photon has also the wave character. The photon wave can be loaded with information (bits), and according to some experiments on lab, such a method is potentially capable to improve the wireless internet capacity significantly, possibly at the order of 100-160 Gigabits per second. But this method needs to be developed further before it can be used as practical technology (15).

(Note: if the readers are interested to carry out further investigations on one or more of the above directions, you can contact me at email: victorchristianto@gmail.com.*)

Concluding remarks

For further discussion, there is my recent book discussing a new cosmology model starting from a fractal vibrating string. (fractal vibrating string is fractal generalization of classical wave equation of sound). See (5).

The basic idea of this book is that it is possible to develop a new cosmology model inspired by Cosmic Christology. In other words, Christology is not a separate matter from science. From Christology as starting point, I began to develop various approaches based on wave physics, which I call: “fractal vibrating string.” Through this new cosmology model, I wish to offer a new path for dialogue between science and theology. Moreover, it offers a new and fresh approach to understand the bible in this modern time.

I also wish that I already presented my interpretation on Cosmic Christology based on the Johannine prologue, albeit not a complete one.

As a last remark, allow me to cite Psalm 19:1-3

1 "The heavens declare the glory of God; and the firmament sheweth his handywork.

2 Day unto day uttereth speech, and night unto night sheweth knowledge.

3 There is no speech nor language, where their voice is not heard. "(KJV)

May God be with you. *Soli Deo Gloria.*

Version 1.0: 7 march 2017, pk. 11:51

Version 1.1: 7 march 2017, pk. 16.44

VC

References:

(1) http://johnrolandpenner.com/Articles/Logos-Cymatics.html

(2) http://home.earthlink.net/~johnrpenner/Articles/Ainulindale.html

(3) http://www.cymascope.com/cyma_research/biology.html

(4) http://www.elizabethbauerconsults.com/cymatics-today.html

(5)

http://www.unesco.chair.network.uevora.pt/media/kunena/attachments/731/ChristologyReloaded_Aug2016.pdf

(6) Robbyanto Notomihardjo. Kristologi Kosmik: tinjauan ulang dari sudut biblikal, teologikal dan historikal. Veritas 1/1, April 2000, 29-38

(7) Larry L. Helyer. Cosmic Christology and Col. 1:15-20. JETS 37/2, June 1994.

(8) Thorstein Theodor Tollefsen. The Christocentric Cosmology of St. Maximus the Confessor. New York: Oxford University Press, 2008.

(9) Luc Montagnier et al. DNA waves and water. Journal of Physics: Conf. Series 306, 2011. Url: http://montagnier.org/IMG/pdf/DNA_waves_and_water.pdf

(10) Victor Christianto. Evolving Trends in Engineering and Technology vol. 4, 2015. Url: https://www.scipress.com/ETET.4.1

(11) Victor Christianto. An outline of cosmology based on interpretation of The Johannine Prologue. BSMaSS Vol. 11, 2014. Url: https://www.scipress.com/BSMaSS.11.4.pdf

(12) Victor Christianto. https://www.scipress.com/IFSL.4.7

(13) Amedeo Balbi. The music of the Big Bang. Berlin: Springer-Verlag, 2008.

(14) Victor Christianto. Url: http://vixra.org/pdf/1603.0230v1.pdf

(15) Victor Christianto. Url: http://rxiv.org/abs/1603.0229

(16) Victor Christianto. On the origin of macroquantization in astrophysics and celestial motion. Annales de la Fondation Louis de Broglie Vol. 31 No. 1, 2006. url:

https://www.researchgate.net/publication/240305621_On_the_origin_of_macroquantization_in_ astrophysics_and_celestial_motion

(17) Victor Christianto. A Cantorian Superfluid Vortex and the Quantization of Planetary motion. Apeiron Vol. 11, No. 1, January 2004. Url: http://redshift.vif.com/JournalFiles/V11NO1PDF/V11N1CHR.pdf

(18) Victor Christianto. Comparison of Predictions of Planetary Quantization and Implications of the Sedna Finding. Apeiron Vol. 11 No. 3, July 2004. Url: https://www.researchgate.net/publication/228393806_Comparison_of_Predictions_of_Planetary_Quantization_and_Implications_of_the_Sedna_Finding

(19) Victor Christianto & Florentin Smarandache. 2005. On recent discovery of new planetoids in the solar system and quantization of celestial system. Url: http://www.gallup.unm.edu/~smarandache/ScArt6/RecentDiscoveryPlanetoids.pdf

(20) Alistair I.M. Rae. Quantum Mechanics. 3rd ed. See for example: http://avxhome.se/ebooks/Quantum_Mechanics_4th.html

(21) Victor Christianto. A review of Schrodinger equation and classical wave equation. Prespacetime Journal, july 2014. Url: http://prespacetime.com/index.php/pst/article/view/625

(22) P. Papaspirou & X. Moussas. The Hellenistic and Alexandrian influences on Johannes Kepler's work. (2016) Accessed online from http://www.academia.edu

APPENDIX: A reflection of my journey over the past 20 years or so

Early days

I should admit here: that for some time in the past I have fallen to become such an idol worshipper, especially in the period between 1997-2014. In 1996 I bought a book edited by Wojciech Zurek with title "Complexity, Entropy and the Physics of Information", published by Santa Fe Institute (Addison-Wesley, 1991). Since then, practically I was very enthusiastic on various interpretations of Quantum Mechanics. I then read several books on QM, including Alistair Rae's book. (15)

After around six years of independent study in wave mechanics, I decided that time has come to put my ideas in writing. In 2002 I submitted my first paper to Apeiron editor, but it was rejected soon. I forgot about the title. Then I put more effort to write a quite speculative paper, based on hypothesis that the solar system can be modelled as quantized vortices of superfluid helium. Using this new model which is essentially a Bohr model of atom applied to solar system, I made a desperate effort in the form of two things: (a) predicting a brown dwarf companion of the Sun with negative mass about equal with the Sun, (b) predicting three undiscovered planets in the outer orbits of the Solar system, beyond Pluto orbit (at the time of writing, no such planet was discovered by astronomers).

The reviewer of this paper was Prof. Robert Kiehn, and he was so kind to read my often confusing English expressions. I am indebted to him, because he was the first person who gave encouragement to my endeavor. After editing and rewriting this 43-pages paper for about one year and a half, finally the editor of Apeiron received my paper for publication. It was published in January 2004 (12).

To my surprise, around four months later I read an online news telling that a new planetoid beyond pluto was found, dubbed as Sedna. It was discovered by Michael Brown and his team of astronomers from Caltech. I then rushed to my old desktop pc to calculate its orbit and to compare it with my prediction back in 2002, and I found that Sedna's orbit is very close to my prediction. Then I quickly wrote a paper discussing Sedna finding. This paper was received and published in Apeiron's July 2004 edition (13). See also an updated paper (14).

After what may be called a beginner's luck, I felt so motivated to continue my investigation on quantum mechanics, especially in deterministic QM with quantum vortice interpretation of wavefunction. These early period investigations have been documented in several books and papers***, including in Annales de la Fondation Louis de Broglie, 2006 (11).

Over those early years, I have learned from many interesting persons, including but not limited to Prof. Brian Josephson, Prof. Carlos Castro, Prof. Mat Pitkanen, Dr. Jack Sarfatti, Prof. Florentin Smarandache, Dmitri Rabounski etc. Almost all those people whom I knew via email conversations have one similarity, i.e. they were dissidents and were completely or partially blacklisted by www.arxiv.org,**** the online "temple" of mainstream physics, especially it is a place to worship high energy physics.**

In 2005, through email discussion, Prof. Brian Josephson (Noble laureate) suggested a name for our new alternative preprint server, that is www.sciprint.org. Since may 2005, then I became administrator of www.sciprint.org. I administered sciprint.org beside my daily profession until 2009 when for some reasons, my admin password was compromised, so I cannot continue administering that preprint server.

Fortunately, a colleague told me that a new preprint service has just come to appear, i.e. www.vixra.org, administered by Dr. Phil Gibbs ("vixra" is "arxiv" read backward). Then I asked him whether he would like to host our files in sciprint.org. After he accepted, then I tried my best to recover and send these files of almost 300MB to a friend in Germany, who then downloaded the files and burned those files into a disc. Thereafter he mailed the disc to Phil Gibbs in England. That is why until now you will find some papers in vixra.org with small notes that they were recovered from www.sciprint.org.

(Note: If you want to verify this story of sciprint.org, you can contact Prof. Carlos Castro Perelman at perelmanc@hotmail.com, or Prof. Florentin Smarandache at fsmarandache@gmail.com)***

Moment of enlightenment

Around October 2009, in a prayer Jesus Christ called me to become His servant, and one of His instruction was I must return to my hometown. Then I went to my hometown in East Java, and began to serve in a local church where I grew up with. In 2011, I decided to equip myself with a formal education in theology. In those years I was quite busy with other things, so practically I left behind science stuff. I guess I should leave science behind me, that at a point I did not answer back when Prof. Florentin Smarandache called me in phone.

But gradually I found a balance in my life, so I tried to write some papers again since. I also compiled a few books on astrophysics with Prof. Florentin Smarandache.

Then I came to a point that my theology education was almost completed, so I can return to former fields of interest: cosmology and astrophysics.

Around May 2014, when I was travelling in a bus, then a thought came to me: what is the power behind a worship song? It came to me that it was frequency which has power to turn even the walls of Jericho to ruining. This was my first moment of enlightenment.

The second moment came around that time (may-june), when I found some papers by Dr. George Shpenkov (http://shpenkov.janmax.com), who was able to show convincingly that there are many errors with Schrodinger equation. So I concluded that it was not only the mistake of

Max Born who introduced probability interpretation of quantum mechanics, but Schrodinger himself made serious errors too in deriving his then famous equation.

Then I wrote a paper reviewing Schrodinger equation and classical wave equation, that paper was published in Prespacetime Journal, july 2014 (16). Although I agree with Dr. Shpenkov that classical wave equation is better than the Schrodinger equation, it does not mean that I agree with his dialectic philosophy.

Gradually, I came to think that frequency and wave were also important at the time of creation, therefore I began my study into an interpretation of Cosmic Christology through the Johannine prologue (John 1:1-18).

I hope that I have told my story with clarity. It should be clear that I began as a dissident in the same temple of Quantum Mechanics, but gradually I turned out to refuse to worship those "gods" of mainstream physics. Instead, I decided to develop a new path where science and theology can meet.

Hopefully the above story will inspire many more young students and graduate students alike to return to God, instead of wandering around from one temple to another, only to find many kinds of deception over and over again.

Postscript:

*url: http://researchgate.net/profile/Victor_Christianto

**I sincerely do hope that someday arxiv.org administrators will change their draconian policy and cumbersome submitting procedures. Fortunately there is news that they are now conducting an online survey (dated 6th april 2016), so I hope that many dissidents like me can submit papers without being rejected by arxiv.org.

***Check our books in pdf version at the homepage of Prof. Florentin Smarandache,

http://fs.gallup.unm.edu/FlorentinSmarandache.htm

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From Acoustic Analog of Space, Cancer Therapy, to Acoustic Sachs-Wolfe Theorem:
A Model of the Universe as a Guitar

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ABSTRACT

It has been known for long time that the cosmic sound wave was there since the early epoch of the Universe. Signatures of its existence is abound. However, such an acoustic model of cosmology is rarely developed fully into a complete framework from the notion of space, cancer therapy up to the sky. This paper may be the first attempt towards such a complete description of the Universe based on classical wave equation of sound. It is argued that one can arrived a consistent description of space, elementary particles, Sachs-Wolfe acoustic theorem, up to a novel approach for cancer therapy, starting from this simple classical wave equation of sound. We also discuss a plausible extension of Acoustic Sachs-Wolfe theorem based on its analogue with Klein-Gordon equation to become Acoustic Sachs-Wolfe-Christianto-Smarandache-Umniyati (ASWoCSU) equation. It is our hope that the new proposed equation can be verified with observation data. But we admit that our model is still in its infancy, more researches are needed to fill all the missing details.

Keywords: acoustic metric, acoustic analogue of space, acoustic cosmology, Sachs-Wolfe theorem, cancer therapy with frequency.

Contents:

1. Introduction

In one of his remarkable papers, the late C.K. Thornhill wrote as follows: [1]

> "Relativists and cosmologists regularly refer to space-time without specifying precisely what they mean by this term. Here the two different forms of spacetime, real and imaginary, are introduced and contrasted. It is shown that, in real space-time (x, y, z, ct), Maxwell's equations have the same wave surfaces as those for sound waves in any uniform fluid at rest, and thus that Maxwell's equations are not general and invariant but, like the standard wave equation, only hold in one unique frame of reference. In other words, Maxwell's equations only apply to electromagnetic waves in a uniform ether at rest. But both Maxwell's equations and the standard wave equation, and their identical wave surfaces, transform quite properly, by Galilean transformation, into a general invariant form which applies to waves in any uniform medium moving at any constant velocity relative to the reference-frame. It was the mistaken idea, that Maxwell's equations and the standard wave equation should be invariant, which led, by a mathematical freak, to the Lorentz transform (which demands the non-ether concept and a universally constant wave-speed) and to special relativity. The mistake was further compounded by misinterpreting the differential equation for the wave hypercone through any point as the quadratic differential form of a Riemannian metric in imaginary space-time (x, y, z, ict). Further complications ensued when this imaginary space-time was generalised to encompass gravitation in general relativity."

In a sense, we also learn about the significance of Newtonian concept of space and time from Prof. Akira Kanda, logician mathematician. Therefore, in this paper we will start with a simple premise that the space itself has an acoustic origin, and it relates to Maxwell equations. Maxwell equations can be expressed in terms of vortex sound equation. So it will indicate a new interpretation of aether in acoustic terminology.

It is argued that one can arrive at a consistent description of space, elementary particles, Sachs-Wolfe acoustic theorem, up to a novel approach for cancer therapy, starting from this simple classical wave equation of sound. We also discuss a plausible extension of Acoustic Sachs-Wolfe theorem based on its analogue with Klein-Gordon equation to become Acoustic Sachs-Wolfe-Christianto-Smarandache-Umniyati (ASWoCSU) equation.

It is our hope that the new proposed equation can be verified with observation data both at lab scale and also at large scale astronomy data. But we admit that our model is still in its infancy, more researches are needed to fill all the missing details.

2. Acoustic Analogue of Space

In this section, we borrow some important ideas from C.K. Thornhill and also Tsutomu Kambe. According to Thornhill, real space-time is a four dimensional space consisting of three-dimensional space plus a fourth length dimension obtained by multiplying time by a constant speed. (This is usually taken as the constant wave-speed c of electromagnetic waves). If the four lengths, which define a four-dimensional metric (x, y, z, ict), are thought of as measured in directions mutually at right-angles, then the quadratic differential form of this metric is:[1]

$$(ds)^2 = (dx)^2 + (dy)^2 + (dz)^2 - \bar{c}^2 (dt)^2 \tag{1}$$

When the non-differential terms are removed from Maxwell's equations, i.e. when there is no charge distribution or current density, it can easily be shown that the components (E1 ,E2 ,E3) of the electrical field-strength and the components (H1 ,H2 ,H3) of the magnetic field-strength all satisfy the standard wave equation:[1]

$$\nabla \phi = \left(\frac{1}{\bar{c}^2} \right) \frac{\partial^2 \phi}{\partial t^2} \tag{2}$$

It follows immediately, therefore, that the wave surfaces of Maxwell's equations are exactly the same as those for sound waves in any uniform fluid at rest, and that Maxwell's equations can only hold in one unique reference-frame and should not remain invariant when transformed into any other reference-frame. In particular, the equation for the envelope of all wave surfaces which pass through any point at any time is, for equation (2), and therefore also for Maxwell's equations,[1]

$$(dx)^2 + (dy)^2 + (dz)^2 = \bar{c}^2 (dt)^2 \tag{3}$$

Or

$$\frac{(dx)^2}{(dt)^2} + \frac{(dy)^2}{(dt)^2} + \frac{(dz)^2}{(dt)^2} = \bar{c}^2 \tag{4}$$

It is by no means trivial, but it is, nevertheless, not very difficult to show, by elementary standard methods, that the general integral of the differential equation (4), which passes through (x1, y1, z1) at time t1, is the right spherical hypercone[1]

$$(x - x_1)^2 + (y - y\ \ )^2 + (z - z_1)^2 = \bar{c}^2 (t - t_1)^2 \tag{5}$$

In other words, both Maxwell equations and space itself has the sound wave origin. We shall see later that this interpretation of Thornhill's work is consistent with the so-called acoustic Sachs-Wolfe theorem which is known in cosmology setting.

It is also interesting to remark here that Maxwell equations can be cast in the language of vortex sound theory, as follows.

Prof. T. Kambe from University of Tokyo has made a connection between the equation of vortex sound and fluid Maxwell equations. He wrote that it would be no exaggeration to say that any vortex motion excites *acoustic* waves. He considers the equation of vortex sound of the form: [2]

$$\frac{1}{c^2}\partial_t^2 p - \nabla^2 p = \rho_0 \nabla . L = \rho_0 div(\omega \times v) \tag{6}$$

He also wrote that dipolar emission by the vortex-body interaction is:[3]

$$p_F(x,t) = -\frac{P_0}{4\pi c}\dot{\Pi}_i(t-\frac{x}{c})\frac{x_c}{x^2} \tag{7}$$

Then he obtained an expression of fluid Maxwell equations as follows [4]:

$$\begin{aligned} &\nabla \cdot H = 0 \\ &\nabla \cdot E = q \\ &\nabla \times E + \partial_t H = 0 \\ &a_0^2 \nabla \times H - \partial_t E = J \end{aligned} \tag{8}$$

Where [4]:

a_0 denotes the sound speed, and

$$\begin{aligned} &q = -\partial_t(\nabla \cdot \upsilon) - \nabla \hbar, \\ &J = \partial_t^2 v + \nabla \partial_t h + a_o^2 \nabla \times (\nabla \times \upsilon) \end{aligned} \tag{9}$$

In our opinion, this new expression of fluid Maxwell equations suggests that there is a deep connection between vortex sound and electromagnetic fields. However, it should be noted that the above expressions based on fluid dynamics need to be verified with experiments. We should note also that in (8) and (9), the speed of sound a_0 is analogous of the speed of light in Maxwell equations, whereas in equation (6), the speed of sound is designated "c" (as analogous to the light speed in EM wave equation). For alternative hydrodynamics expression of electromagnetic fields, see [7].

The above interpretation of fluid Maxwell equations from vortex sound theory has been discussed in our recent paper, to appear in forthcoming issue of JCMNS [5].

3. Comparison between Schrödinger equation and Classical wave equation of sound

In the initial variant, the Schrodinger equation (SE) has the following form [8]:

$$\Delta\Psi + \frac{2m}{\hbar^2}\left(W + \frac{e^2}{4\pi\varepsilon_o r}\right)\Psi = 0 \quad (10)$$

The wave function satisfying the wave equation (10) is represented as:

$$\Psi = R(r)\Theta(\theta)\Phi(\varphi)T(t) = \psi(r,\theta,\varphi)T(t) \quad (11)$$

Where $\psi(r,\theta,\varphi) = R(r)\Theta(\theta)\Phi(\varphi)$ is the complex amplitude of the wave function, because

$$\Phi_m(\varphi) = C_m e^{\pm im\varphi} \quad (12)$$

For standard method of separation of variables to solve spherical SE, see for example [11-13].

The Φ, Θ and T equations were known in the theory of wave fields. Hence these equations presented nothing new. Only the R was new. Its solution turned out to be *divergent*. However, Schrödinger together with H. Weyl (1885-1955), contrary to the logic of and all experience of theoretical physics, artificially cut off the divergent power series of the radial function R(r) at a κ-th term. This allowed them to obtain the radial solutions, which, as a result of the cut off operation, actually were the fictitious solutions.[8]

Furthermore, it can be shown that the time-independent SE [9][10]:

$$\nabla\Psi + \frac{2m}{\hbar^2}(E - V)\Psi = 0, \quad (13)$$

Can be written in the form of standard wave equation [8]:

$$\nabla\Psi + k^2\Psi = 0, \tag{14}$$

Where

$$k = \pm\sqrt{\frac{2m}{\hbar^2}(E - V)}\,. \tag{15}$$

Or if we compare (14) and (10), then we have [8]:

$$k = \pm\sqrt{\frac{2m}{\hbar^2}\left(W + \frac{e^2}{4\pi\varepsilon_o r}\right)}\,. \tag{16}$$

This means that the wave number k in Schrödinger's radial wave equation is a quantity that varies continuously in the radial direction. Is it possible to imagine a field where the wave number, and hence the frequency, change from one point to another in the space of the field? Of course, it is not possible. Such wave objects do not exist in Nature.

The unphysical nature of Schrödinger wavefunction has created all confusing debates throughout 90 years. But it is rarely discussed in QM textbooks, on how he arrived at his equation. It is known that Schrodinger began with Einstein's mass-energy relation then he proceeded with Hamilton-Jacobian equation. At first he came to a similar fashion of Klein-Gordon equation, but then he arrived to a new equation which is non-relativistic. Logically speaking, he began with a relativistic assumption and he came to a nonrelativistic expression, and until now physicists remain debating on how to relativize Schrodinger equation. That is logically inconsistent and therefore unacceptable, and Schrodinger himself never knew where the problem lies. Until now people remain debating the problem of the meaning of his wavefunction, but it starts with unphysical nature of his equation. This is a common attitude of many young physicists who tend to neglect the process and logical implication of QM derivation, and they never asked about whether Schrodinger equation has deep logical inconsistency or not.

Moreover, there are some limitations in applying Schrödinger equation to experiments, although many textbooks on QM usually overlook existing problems on how to compare 3D spherical solution of Schrodinger equation with experimental data. The contradiction between QM and experiments are never discussed publicly, and this is why the most modern physicists hold the assertion that QM describes accurately "ALL" physical experiments; that is an unfounded assumption. George Shpenkov began with classical wave equation and he is able to derive a periodic table of elements which is very close to Mendeleev's table. And this is a remarkable achievement which cannot be done with standard wave mechanics.[1]

Nonetheless, equation (14) and (15) which suggests analogy between wave mechanics and sound wave equation has been discussed briefly by Hilbert & Batelaan [14]. And it seems worthy to explore further in experiments.

4. Derivation of Klein-Gordon equation from the Classical Wave equation

It is also possible to find theoretical correspondence between classical electromagnetic wave equation and Klein-Gordon equation. Such a correspondence has been discussed by David Ward & Sabine Volkmer [15]. They give a simple derivation of the KGE, which

[1] For further discussion, it is advisable to check the website of Dr. George Shpenkov, at http://shpenkov.janmax.com. See especially Shpenkov, George P. 2013. *Dialectical View of the World: The Wave Model (Selected Lectures).* Volume I: Philosophical and Mathematical Background. URL: http://shpenkov.janmax.com/Vol.1.Dialectics.pdf

requires only knowledge of the electromagnetic wave equation and the basics of Einstein's special theory of relativity.

They begin with electromagnetic wave equation in one dimensional case:

$$\frac{\partial^2 E}{\partial x^2} - \frac{1}{c^2}\frac{\partial^2 E}{\partial t^2} = 0. \tag{17}$$

This equation is satisfied by plane wave solution:

$$E(x,t) = E_0 e^{i(kx-\omega t)}, \tag{18}$$

Where $k = \frac{2\pi}{\lambda}$ and $\omega = 2\pi\nu$ are the spatial and temporal frequencies, respectively. Substituting equation (18) into (17), then we obtain:

$$\left(\frac{\partial^2}{\partial x^2} - \frac{1}{c^2}\frac{\partial^2}{\partial t^2}\right) E_0 e^{i(kx-\omega t)} = 0 \tag{19}$$

Or

$$\left(k^2 - \frac{\omega^2}{c^2}\right) E_0 e^{i(kx-\omega t)} = 0 \tag{20}$$

Solving the wave vector, we arrive at dispersion relation for light in free space: $k = \frac{\omega}{c}$.

Note that this is similar to wave number k in equation (14).

Then, recall from Einstein and Compton that the energy of a photon is $\varepsilon = h\nu = \hbar\omega$ and the momentum of a photon is $p = \frac{h}{\lambda} = \hbar k$. We can rewrite equation (18) using these relations:

$$E(x,t) = E_0 e^{\frac{i}{\hbar}(px-\varepsilon t)}, \tag{21}$$

Substituting this equation into (17) we find:

$$-\frac{1}{\hbar^2}\left(p^2-\frac{\varepsilon^2}{c^2}\right)E_0 e^{\frac{i}{\hbar}(px-\varepsilon t)}=0 \tag{22}$$

Then we get an expression of relativistic total energy for a particle with zero rest mass:

$$\varepsilon^2 = p^2c^2\,. \tag{23}$$

We now assume with de Broglie that frequency and energy, and wavelength and momentum, are related in the same way for classical particles as for photons, and consider a wave equation for non-zero rest mass particles. So we want to end up with:

$$\varepsilon^2 = p^2c^2 + m^2c^4\,. \tag{24}$$

Inserting this equation (24) into equation (22), it is straightforward from (19), that we get:

$$\left(\nabla^2-\frac{m^2c^2}{\hbar^2}\right)\Psi=\frac{1}{c^2}\frac{\partial^2\Psi}{\partial t^2} \tag{25}$$

which is the Klein-Gordon equation for a free particle [15].

Having derived KGE from classical electromagnetic wave equation, now we are ready to discuss its implication in description of elementary particles. This will be discussed in the next section.

Interestingly, it can be shown that by using KGE one can describe hydrogen atom including electron spin without having to resort to the complicated Dirac equation [16]. It also appears worthnoting here that Meessen workout a description of elementary particles from excitation of spacetime, by starting from KGE and a novel assumption of quantized spacetime dx=n.a.[17]

However, we will not discuss Ducharme's and Meessen's approach here, instead we will put more attention on how to extend Acoustic Sachs-Wolfe theorem by virtue of KGE.

5. Acoustic Sachs-Wolfe theorem and its plausible extension

According to Czaja, Golda, and Woszczyna [19], if one considers the acoustic field propagating in the radiation-dominated ($p=\varepsilon/3$) universe of arbitrary space curvature ($K=0,\pm1$), then the field equations are reduced to the d'Alembert equation in an auxiliary static Robertson-Walker spacetime. This is related to the so-called *Sachs-Wolfe acoustic* theorem, which can be found useful in the observation and analysis of Cosmic Microwave Background anisotropies.

In the meantime, there are papers suggesting that the integrated Sachs-Wolfe theorem may be useful to study dark energy, but we do not enter in such a discussion. See [22] for instance.

The Sachs–Wolfe acoustic theorem refers to the spatially flat ($K=0$), hot ($p=\varepsilon/3$) Friedmann–Robertson–Walker universe and the scalar perturbation propagating in it. The theorem states that with the appropriate choice of the perturbation variable, one can express the propagation equation in the form of d'Alembert's equation in Minkowski spacetime. Scalar perturbations in the flat, early universe propagate like electromagnetic or gravitational waves ([18], p. 79).

On the other hand, the wave equation for the scalar field of the dust (p=0) cosmological model can be transformed into the d'Alembert equation in the static Robertson–Walker spacetime, regardless of the universe's space curvature (see [18]). Therefore, we can suppose that the flatness assumption in the Sachs–Wolfe theorem is not needed and that the theorem is true in the general case. The proof of this fact, formulated as a symbolic computation, is presented in the first section of this paper.

In accordance with Czaja, Golda, and Woszczyna [19], we begin with Robertson–Walker metrics in spherical coordinates $x^{\sigma=\{\eta,\chi,\vartheta,\phi\}}$:

$$g_{(\mathcal{RW})} = a^2(\eta)\begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & \dfrac{\sin^2(\sqrt{K}\chi)}{K} & 0 \\ 0 & 0 & 0 & \dfrac{\sin^2(\sqrt{K}\chi)\sin^2(\vartheta)}{K} \end{bmatrix} \tag{26}$$

with the scale factor $a(\eta)$ appropriate for the equation of state $p=\varepsilon/3$,

$$a(\eta) = \frac{\sin(\sqrt{K}\chi)}{\sqrt{K}}. \tag{27}$$

Let us define a new perturbation variable Ψ with the help of the second-order differential transformation of the density contrast δ,

$$\Psi(x^\sigma) = \frac{1}{\cos(\sqrt{K}\chi)}\frac{\partial}{\partial\eta}\left(\frac{K}{\tan^2(\sqrt{K}\chi)}\frac{\partial}{\partial\eta}\left(\frac{\tan^2(\sqrt{K}\chi)}{K}\cos(\sqrt{K}\chi)\delta(x^\sigma)\right)\right). \tag{28}$$

The function $\Psi(x^{\sigma})$ is the solution of the d'Alembert equation:

$$\frac{\partial^2}{\partial\eta^2}\Psi(x^\sigma) - \frac{1}{3}\,\Delta\Psi(x^\sigma) = 0, \tag{29}$$

with the Beltrami–Laplace operator Δ acting in this space,

$$
{}^{(3)}g = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \dfrac{\sin^2(\sqrt{K}\chi)}{K} & 0 \\ 0 & 0 & \dfrac{\sin^2(\sqrt{K}\chi)\sin^2(\vartheta)}{K} \end{bmatrix}. \tag{30}
$$

The Beltrami–Laplace operator Δ is defined as follow

$$
\Delta = {}^{(3)}g_{mn}\nabla^m\nabla^n . \tag{31}
$$

And it can be considered as an extension of Laplace operator for curved space.

Now let us discuss a basic question: what is Laplace-Beltrami operator? In differential geometry, the Laplace operator can be generalized to operate on functions defined on surfaces in Euclidean space and, more generally, on Riemannian and pseudo-Riemannian manifolds. This more general operator goes by the name Laplace-Beltrami operator, after Pierre-Simon Laplace and Eugenio Beltrami. Like the Laplacian, the Laplace-Beltrami operator is defined as the divergence of the gradient, and is a linear operator taking functions into functions. The operator can be extended to operate on tensors as the divergence of the covariant derivative. Alternatively, the operator can be generalized to operate on differential forms using the divergence and exterior derivative. The resulting operator is called the Laplace-de Rham operator (named after Georges de Rham).

Now, considering the formal equivalence between the form of (29) with KGE (25), minus the mass term, then it seems reasonable to include the mass term into (29). Then the extended version of equation (29) may be written as:

$$\frac{\partial^2}{\partial \eta^2}\Psi\left(x^\sigma\right)-\frac{1}{3}\Delta\Psi\left(x^\sigma\right)=-I\frac{m^2c^2}{\hbar^2}\Psi \quad , \tag{32}$$

Where I is identity matrix as follows:

$$I=\begin{bmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{bmatrix}. \tag{33}$$

The above equations (32) and (33) can be considered as a plausible extension of Acoustic Sachs-Wolfe theorem based on its analogue with Klein-Gordon equation to become Acoustic Sachs-Wolfe-Christianto-Smarandache-Umniyati (ASWoCSU) equation. Its usefulness remains to be verified with observation data.

6. A novel method of cancer therapy with frequency

Cancer constitutes one of the most serious causes of death worldwide and according to WHO, it accounted for 7.6 million deaths (around 13% of all deaths) in 2008 [23]. Deaths from cancer are projected to continue rising to over 11 million in 2030 [23]. Cancer is the end result of a series of genetic alterations that modify the control of proteins that promote (i.e. oncogenesis) or inhibit (i.e. suppressor genes) cell proliferation [23].

It is known that conventional chemotherapy has average success rate of less than 25%, which seems to suggest that we need a better therapy for cancer. Chemotherapy and radiation employ non-specific toxic effects to inhibit the proliferation of both normal and tumor cells.

Hence side effects include hair loss, digestive problems and immune suppression. In order to reduce toxicity, current academic and pharmaceutical investigations are focusing on identifying novel methods to reverse cancer specific alterations in oncogenes or suppressor genes.

In this regard, specific low frequency EMT has been reported to restore the homeostatic function of genes involved with controlling cell growth. An assembly of cells, as in a tissue or organ, will have certain collective frequencies that regulate important processes, such as cell division. Hence, providing the correct or “healthy” frequency that entrains the oscillations back to coherence can restore growth control.[23]

Published studies using cancer cell cultures and animal tumor models demonstrate that EMT induces cell death (i.e. apoptosis). The correlation between cell membrane potential and cancer cell proliferation was detailed in a classic paper by Cone (1970), see [23].

In vivo: several studies come to prove that anticancer activity of certain electric fields. In one of them, low intensity, intermediate frequency (100-300 kHz), alternating electric fields were used in in vivo treatment of tumours in C57BL/6 and BALB/c mice (B16F1 and CT-26 syngeneic tumour models, respectively) and induced significant slowing of tumour growth and extensive destruction of tumour cells within 306 days.[23].

In another study of Barbault et al., it is proposed that a combination of tumour-specific frequencies may have a therapeutic effect. A total of 1524 frequencies, ranging from 0.1 to 114 kHz, were identified from 163 cancer patients, while a compassionate treatment was offered to 28 patients with advanced cancer (breast, ovarian, pancreas, colon, prostate, sarcoma, and other types). None of the patients, who received experimental therapy, reported any side effects of significance. Thus, the tumour-specific frequencies provide an effective and well tolerated treatment which may present anti-tumour properties in end-stage patients [23].

In the meantime, the study of cancer treatment with nanoparticles in an oscillating magnetic field began in the 1950s. In the late 1970s, researchers suggest that special coatings on the magnetic nanoparticles would cause them to selectively penetrate into cancer cells. This concept would allow intravene delivery of the nanoparticles into the body, followed by natural aggregation of the cancer tumor with nanoparticles. Recent developments in biochemistry make this novel approach feasible. Once selective coatings is available, electromagnetic heating will offer the unique advantage of selective heating only the cancer tumor. [23]

7. Discussion and Concluding Remarks

We have discussed how the very definition of Newtonian space can be related to sound wave and also Maxwell equations, and also how fluid Maxwell equations can be formulated based on vortex sound theory.

We have also discussed the inadequacies of Schrodinger equation as a description of elementary particles, instead we established connection from classical electromagnetic wave equation to Klein-Gordon equation.

Then we discuss Acoustic Sachs-Wolfe theorem which is worthy to investigate further in the context of cosmology. We also propose an extension of Acoustic Sachs-Wolfe to become ASWoCYU. In other words, it appears very reasonable to model the Universe and Cosmos in general in terms of sound wave equation.

To summarize, in this paper we tried our best to offer a novel picture of the Universe as a guitar. Further observation and experiments are recommended to verify the above propositions.

Added note: some of the above results have been presented in few earlier works of the first author (VC).

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VC dedicates this paper for Jesus Christ, He is the Logos, the true Savior of the Universe and all creation, and the Good Shepherd.

As closing words, allow us to quote from David's book of Psalm:

"*The heavens declare the glory of God;*

The skies proclaim the work of His hands.

Day after day they pour forth speech;

Night after night they display knowledge.

There is no speech or language where their voice is not heard.

Their voice goes out into all the earth,

Their words to the ends of the world." (Psalm 19:1-4; NIV)

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References

[1] C.K. Thornhill. Real or imaginary space-time? Reality or Relativity? *Hadronic Journal Suppl*. 11, 3, (1996) 209-224

[2] Tsutomu Kambe. 2010. Vortex sound with special reference to vortex rings: theory, computer simulation, and experiments. *Int. J. Aeroacoustics* vol. 9 no. 1&2, p.52. URL: http://www.purple.dti.ne.jp/kambe/IJA09-Vortex-Sound.pdf

[3] _______. 2004. Theory of vortex sound with special reference to vortex rings. *Int. Conf. on Math. Fluid Dy*n., Dec. 2004. URL: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.571.8078&rep=rep1&type=pdf

[4] _______. New formulation of equations of compressible fluids on analogy of Maxwell equations. *Fluid Dyn. Res*. 42 (2010), p.4 . URL: http://www.purple.dti.ne.jp/kambe/FDR-IOP-42(2010).pdf

[5] V. Christianto, Y. Umniyati, & V. Krasnoholovets. On plausible role of Classical Electromagnetic Theory and Submicroscopic Physics to understand and enhance Low Energy Nuclear Reaction (LENR): A Preliminary Review. To appear in forthcoming issue of JCMNS 23(2016) 1-8. URL: Http://www.iscmns.org

[6] Murat Tanisli et al. Octonic formulations of Maxwell type fluid equations. *J. Math. Phys.* 56, 091701 (2015). url: http://scitation.aip.org/content/aip/journal/jmp/56/9/10.1063/1.4930805

[7] Mario Liu. Hydrodynamic Theory of Electromagnetic Fields in Continuous Media. *Phys. Rev. Lett.* Vol. 70, No. 23 (1993). URL: http://www.uni-tuebingen.de/fileadmin/Uni_Tuebingen/Fakultaeten/MathePhysik/Institute/ITP/Dokumente/liu/phys-rev-lett-70-3580_1993.pdf

[8] Shpenkov, George P. &Kreidik, Leonid G. 2005. Schrödinger’s error in principle. *Galilean Electrodynamics* Vol. 16, No. 3, 51-56 URL: http://shpenkov.janmax.com/Blunders.pdf

[9] Schrödinger, Erwin. 1926. Quantisation as a Problem of Proper Values. Part I. In *Collected papers in Wave Mechanics*. (Providence, Rhode Island: AMS Chelsea Publishing). URL: http://einstein.drexel.edu/~bob/Quantum_Papers/Schr_1.pdf

[10] _______. 1926. An Undulatory Theory of the Mechanics of Atoms and Molecules. *The Physical Review*.Second series.Vol. 28, No. 6. (Dec. 1926): 1049-1070.

[11] Anonymous, *Atomic Spectra*, p.19-21, URL: http://astrowww.phys.uvic.ca/~tatum/stellatm/atm7.pdf

[12] Fowler, Michael. 2007. *Classical Wave Equations*, p.10-12. URL: http://galileo.phys.virginia.edu/classes/252/Classical_Waves/Classical_Waves.pdf

[13] Pain, H.J. 2005. *The Physics of Vibrations and Waves*. 6th ed. John Wiley & Sons, Ltd. ISBN: 0-470-01295-1(hardback); 0-470-01296-X(paperback). 563 p.

[14] Hilbert, Shawn A., &Batelaan, Herman. 2007. Acoustic Analog to Quantum Mechanical Level Splitting. *Am. J. Phys*., Vol. 75, No. 11, Nov. 2007. Also in *Faculty Publications, Department of Physics and Astronomy, University of Nebraska - Lincoln*. Paper 103. URL: http://digitalcommons.unl.edu/physicsfacpub/103

[15] Ward, David W., &Volkmer, Sabine. 2006. *How to derive the Schrödinger equation*. arXiv:physics/0610121. 12 p.

[16] R. Ducharme. Exact Solution of the Klein-Gordon Equation for the Hydrogen Atom Including Electron Spin. arXiv: 1006.3971 (2010)

[17] Meessen, A., *Found. of Phys.*, no. 29 (2000) 281 -316

[18] R. K. Sachs and A. M. Wolfe, "Perturbations of a Cosmological Model and Angular Variations of the Microwave Background," *The Astrophysical Journal*, **147**, 1967 pp. 73–90. doi: 10.1086/148982.

[19] W. Czaja, Z. A. Golda, and A. Woszczyna, “The Acoustic Wave Equation in the Expanding Universe: Sachs–Wolfe Theorem,” *The Mathematica Journal*, 2011.

dx.doi.org/doi:10.3888/tmj.13–18. URL: http://www.mathematica-journal.com/data/uploads/2011/10/CzajaGoldaWoszczyna.pdf ; Also in arXiv:0902.0239 [cs.SC]

[20] L. P. Grishchuk, "Discovering Relic Gravitational Waves in Cosmic Microwave Background Radiation." arXiv:0707.3319v4.

[21] S. Weinberg. *Cosmology*. New York: Oxford University Press Inc., 2008. URL: http://meghnad.iucaa.ernet.in/~tarun/pprnt/teach/cosmology-Weinberg.pdf

[22] S. Nadathur, S. Hotchkiss, S. Sarkar. The integrated Sachs-Wolfe imprint of cosmic superstructures: a problem for ΛCDM. Paper submitted to JCAP. arXiv: 1109.4126

[23] V. Christianto (2015) "A review of Cancer electromagnetic frequency therapy: Towards Physics of Cancer," *Intr. Front. Sci. Lett*., URL: http://www.scipress.com

[24] Wayne Hu & Martin White. The cosmic Symphony. *Scientific American* 2004.

Two Applications of Riccati ODE in Nonlinear Physics and Their Computer Algebra Solutions

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Abstract

In this paper, we will solve 2 Riccati ODEs using Maxima computer algebra package with applications in: (a) generalized Gross-Pitaevskii equation, (b) cosmology problem. The results presented below deserve further investigations in particular for comparison with existing analytical solutions.

1. Introduction

The Riccati equation, named after the Italian mathematician Jacopo Francesco Riccati, is a basic first-order nonlinear ordinary differential equation (ODE) that arises in different fields of mathematics and physics.[4]

Riccati differential equations are known to have many applications in nonlinear physics [1]. In this paper, we will explore only 4 of possible applications of Riccati ODE in literature, i.e. (a) generalized Gross-Pitaevskii equation, (b) KdV-Burgers equation, (c) Ramanujan differential equation, and (d) cosmology problem.

Instead of using standard solution method to solve Riccati ODE, we will use Maxima computer algebra package.

We hope that our results may stimulate further serious investigation on finding numerical solutions of Riccati ODE in various domains of nonlinear physics, number theory, and cosmology.

2. Problem 1: Generalized Gross-Pitaevskii equation (GPE)

The authors in [4] presented the generalized GPE in (3+1)D for the BEC wave function u(x,y,z,t) with distributed time-dependent coefficients: [4]

$$i\partial_t u + \frac{\beta(t)}{2}\Delta u + \chi(t)|u|^2 u + \alpha(t) r^2 u = i\gamma(t)u, \tag{1}$$

Which can be transformed easily into a Riccati ODE form as follows:

$$\frac{da}{dt} + 2\beta(t)a^2 - \alpha(t) = 0 \tag{2}$$

The above Riccati ODE (2) can be rewritten as follows:[3]

$$a(t)' + 2.b(t)\cdot a(t)^2 - c(t) = 0. \tag{3}$$

Maxima expression of Riccati ODE (3) is as follows:[2]

‘diff(a(t),t)+2*b(t)*a(t)^2-c(t)=0 (4)

The Maxima result for this problem is as shown below:

(%i14) 'diff(y,x)+2*b*y^2-c=0;

(%o14) $\frac{d}{dx} y + 2\, b\, y^2 - c = 0$

(%i16) ode2(%,y,x);

*Is b c positive or negative?*negative;

(%o16) $-\frac{\operatorname{atan}\left(\frac{\sqrt{2}\, b\, y}{\sqrt{-b\, c}}\right)}{\sqrt{2}\sqrt{-b\, c}} = x + \%c$

3. Problem 2: Cosmology problem

It can be shown that in Friedmann-Robertson-Walker spacetime the set of Einstein’s equations with the cosmological constant set to zero reduce to differential equations for scale factor a(t), which is a function of comoving time t.[5] Choosing the equation of state to be barotropic and after some transformation and introducing conformal time, the equation reduces to a Riccati equation as follows:[5]

$$u' + cu^2 + kc = 0, \tag{5}$$

The above equation of cosmological Riccati equation has been obtained previously by Faraoni, see [5].

Equation (5) can be rewritten for Maxima as follows:

'diff(a(t),t)+c*a(t)^2+k*c=0 (4)

The result is given below:

(a) Option 1: k=negative constant

(%i24) 'diff(y,x)+c*(y^2+k)=0;

(%o24) $$\frac{d}{d\,x}\,y + c\,(y^2 + k) = 0$$

(%i25) ode2(%,y,x);

Is k positive or negative? negative;

(%o25) $$-\frac{\log\left(-\frac{\sqrt{-k}-y}{y+\sqrt{-k}}\right)}{2\,c\,\sqrt{-k}} = x + \%c$$

(b) Option 2: k=positive constant

(c) (%i27) 'diff(y,x)+c*(y^2+k)=0;

(%o27) $$\frac{d}{d\,x}\,y + c\,(y^2 + k) = 0$$

(%i28) ode2(%,y,x);

Is k positive or negative? positive;

(%o28) $$-\frac{\operatorname{atan}\left(\frac{y}{\sqrt{k}}\right)}{c\,\sqrt{k}} = x + \%c$$

4. Concluding remarks

In this paper, we solve 2 Riccati ODEs using Maxima computer algebra package with applications in: (a) generalized Gross-Pitaevskii equation, (b) cosmology problem. The results as presented below deserve further investigations in particular for comparison with existing analytical solutions.

It is highly recommended to verify these results with other computer algebra packages, such as Maple or Mathematica.

References:

[1] William T. Reid. *Riccati Differential Equations*. New York: Academic Press Inc., 1972

[2] Victor Christianto & Florentin Smarandache. A note on computer solution of wireless Energy transmit via Magnetic Resonance. *Progress in Physics* January 2008, Vol. 1. http://www.ptep-online.com

[3] L.D. Landau, E.M. Lifshitz, *Fluid mechanics, Course of Theoretical Physics 6,* 2nd revised ed., Pergamon Press, ISBN: 0-08-033932-8, 1987.

[4] A.Al Bastami, M.R. Belic, N.Z. Petrovic. Special Solutions of the Riccati equation with Applications to the Gross-Pitaevskii Nonlinear PDE. *Elec. J. Diff. Eq*. Vol 2010 (2010) No. 66, pp. 1-10. url: http://ejde.math.txstate.edu/Volumes/2010/66/albastami.pdf

[5] M. Nowakowski & H.C. Rosu. Newton's law of motion in form of Riccati equation. arXiv:physics/0110066 (2001)

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VC, SE, FS, YU

An Outline of Cellular Automaton Universe via Cosmological KdV equation

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ABSTRACT

It has been known for long time that the cosmic sound wave was there since the early epoch of the Universe. Signatures of its existence are abound. However, such a sound wave model of cosmology is rarely developed fully into a complete framework. This paper can be considered as our *second* attempt towards such a complete description of the Universe based on soliton wave solution of cosmological KdV equation. Then we advance further this KdV equation by virtue of Cellular Automaton method to solve the PDEs. We submit wholeheartedly Robert Kurucz's hypothesis that *Big Bang should be replaced with a finite cellular automaton universe with no expansion*. Nonetheless, we are fully aware that our model is far from being complete, but it appears the proposed cellular automaton model of the Universe is very close in spirit to what Konrad Zuse envisaged long time ago. It is our hope that the new proposed method can be verified with observation data. But we admit that our model is still in its infancy, more researches are needed to fill all the missing details.

Keywords: solitary wave, cosmological KdV equation, nonlinear universe, cellular automata, PDE, Mathematica, Konrad Zuse.

1. Introduction

Konrad Zuse is probably the first scholar who imagine a *Computing Universe*. In recent years, there are a few researchers who suggest similar vision in terms of cellular automata, for example Stephen Wolfram, Gerardus 't Hooft, and Robert Kurucz from Harvard Smithsonian of Astrophysics. Nonetheless, it seems that there is no existing model which can be connected with a nonlinear PDE of the Universe. In this paper, we try to offer some working CA models based on the KdV equation, which can be modelled and solved using computer algebra packages such as Mathematica.

Meanwhile, Korteweg-de Vries (KdV) equation is a non-linear wave equation plays a fundamental role in diverse branches of mathematical and theoretical physics. Its significance to cosmology has been discussed by a number of authors, such as Rosu and recently Lidsey [3][7]. It is suggested that the KdV equation arises in a number of important scenarios, including inflationary cosmology etc. Analogies can be drawn between cosmic dynamics and the propagation of the solitonic wave solution to the equation, whereby quantities such as the speed and amplitude profile of the wave can be identified with cosmological parameters such as the spectral index of the density perturbation spectrum and the energy density of the universe.

Then we advance further this KdV equation by virtue to Cellular Automaton method to solve the PDEs. We submit wholeheartedly Kurucz's hypothesis that *Big Bang should be replaced with a finite cellular automaton universe with no expansion*.[4][5]

Nonetheless, we are fully aware that our model is far from being complete, but perhaps the proposed cellular automaton model of the Universe is very close in spirit to what Konrad Zuse envisaged long time ago. However, we do not exercise possible link between our model and Cellular automaton model of Gerard 't Hooft; that is beyond the scope of this paper.[14]

It is our hope that the new proposed equations can be verified with observation data both at lab scale and also at large scale astronomy data. We also expect that the proposed theoretical models based on CA may offer a clue to answer the great mystery of our

Universe: *the origins of life*.[17][18] This problem remains missing in most existing physical cosmology models.

Nonetheless, we admit that our model is still in its infancy, more researches are needed to fill all the missing details.

2. Cosmological KdV equation

The Korteweg-de Vries (KdV) equation is the completely integrable, third-order, non-linear partial differential equation (PDE):[3]

$$\partial_t u + \partial_x^3 u + \frac{3}{u_0} u \partial_x u = 0, \tag{1}$$

where u = u(x, t), $\partial_t = \partial/\partial t$, $\partial_x^3 = \partial^3/\partial x^3$, etc., u_0 is a constant and (x, t) represent space and time coordinates, respectively. This equation was originally derived within the context of small-amplitude, non-linear water wave theory and it is well known that it admits a solitonic wave solution of the form

$$u = u_0 \lambda^2 \sec h^2 \left[\lambda \left(x - \lambda^2 t \right) / 2 \right], \tag{2}$$

where the constant $\lambda/2$ represents the wavenumber of the soliton. The KdV soliton is characterized by the property that its speed and amplitude are proportional to the square of the wavenumber.

Rosu [7] and also Lidsey [3] both have considered some cosmological applications of KdV equation. We will consider here one application in inflationary universe model.

It can be shown that Friedmann equation after some steps which have been discussed in [3], yields to an equation which takes the form of (2), as follows:

$$H^2(\phi) = H_0^2 \lambda^2 \sec h^2 \left[\lambda A / 2 \right], \tag{3}$$

Where:

$$A = \frac{\sqrt{8\pi}}{m_p}\phi.$$

(4)

Therefore, it appears quite reasonable to consider this equation as originated from certain cosmological KdV physics.

3. Cellular Automata Model of KdV Equation: Towards Cellular Automaton Universe

There are several methods to consider discretization of KdV equation into cellular automata models. Here we briefly discuss only few methods:

a. Based on paper by Steeb & Hardy [11], KdV equation can be written as a conservation law:

$$\frac{\partial u}{\partial t} + \frac{\partial}{\partial x}\left(-\frac{u^2}{2} - \frac{\partial^2 u}{\partial x^2} \right) = 0, \tag{5}$$

It follows that, after the simplest discretization, we obtain the cellular automata:

$$u_j(t+1) = u_j(t)(u_{j+1}(t) - u_j(t)) + u_{j+2}(t) - u_{j+1}(t) - u_{j-1}(t).$$

(6)

Thus $\sum_{j=0}^{N-1} u_j(t)$ is not an invariant.

b. The discrete analogue of the KdV equation is known thanks to the pioneering work of Hirota. It has the form: [16]

$$\frac{1}{u_{l+1}^{t+1}} - \frac{1}{u_l^t} = \delta\left(u_{l+1}^t - u_l^{t+1}\right).$$

(7)

c. Another model was proposed by Tokihiro et al around twenty years ago. They suggested that an integrable discretization (differential-difference equation) of the KdV equation is the Lotka-Volterra equation [15]:

$$\frac{d}{dt}b_j(t) = b_j(t)\left[b_{j+t}(t) - b_{j-1}(t)\right]$$

(8)

In other words, it appears possible at least in theory to consider a Cellular Automaton-KdV Universe, based on discretization of the original KdV equation. Nonetheless, further analysis is required to study its potential applications.

4. Discussion and Concluding Remarks

It has been known for long time that the cosmic sound wave was there since the early epoch of the Universe. Signatures of its existence are abound.[2] However, such an acoustic model of cosmology is rarely developed fully into a complete framework from the notion of space, cancer therapy up to the sky. This paper can be considered as our second attempt towards such a complete description of the Universe based on soliton solution of cosmological KdV equation.

Then we advance further this KdV equation by virtue to Cellular Automaton method to solve the PDEs. Here, we consider some mathematical methods to discretize the original KdV equation in order to be transformed into cellular automata models.

In other words, we submit wholeheartedly Robert Kurucz's hypothesis that *Big Bang should be replaced with a finite cellular automaton universe with no expansion*.[4][5]

Nonetheless, we are fully aware that our model is far from being complete, but perhaps the proposed cellular automaton model of the Universe is very close in spirit to what Konrad Zuse envisaged long time ago.

Further observations and experiments are recommended to verify the above propositions.

Acknowledgement

The first author (VC) dedicates this paper for Jesus Christ, He is the Logos, the true Savior of the Universe and all creation, and the Good Shepherd.

As closing words, allow us to quote from David's book of Psalm:

"*The heavens declare the glory of God;*

The skies proclaim the work of His hands.

Day after day they pour forth speech;

Night after night they display knowledge.

There is no speech or language where their voice is not heard.

Their voice goes out into all the earth,

Their words to the ends of the world." (Psalm 19:1-4; NIV)

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References

[1] Pain, H.J. 2005. *The Physics of Vibrations and Waves*. 6th ed. John Wiley & Sons, Ltd. ISBN: 0-470-01295-1(hardback); 0-470-01296-X(paperback). 563 p.
[2] Wayne Hu & Martin White. The cosmic Symphony. *Scientific American* 2004.
[3] James E. Lidsey. Cosmology and the Korteweg-de Vries equation. arXiv: 1205.5641 [astro-ph.CO]
[4] Robert L. Kurucz. Radiatively-Driven Cosmology in the Cellular Automaton Universe. arXiv:astro-ph/0605469.
[5] Robert L. Kurucz. Elementary Physics in the Cellular Automaton Universe. arXiv:astro-ph/0605467
[6] Hendra Adiwidjaja. On the Korteweg-de Vries equation. December 9, 1995. CDS 141 Project
[7] H.C. Rosu. *Mod. Phys. Lett.* A17, 667 (2002). arXiv: gr-qc/011002
[8] Alwyn C. Scott. *The Nonlinear Universe*. Berlin Heidelberg: Springer-Verlag, 2007.
[9] S. Wolfram. *Cellular Automata and Complexity*. Reading, Mass.: Addison-Wesley, 1994.
[10] S. Wolfram. Cellular Automaton fluids: basic theory. http://www.stephenwolfram.com
[11] Willi-Hans Steeb and Yorick Hardy. One Dimensional Cellular Automata, Conservation Laws, and partial Differential Equations. *Z. Naturforsch*. 62a, 569-572 (2007).
[12] Xin-She Yang & Y. Young. Cellular Automata, PDEs, and Pattern Formation. arXiv: 1003.1983
[13] Pedro P.B. de Oliveira & Mauricio Verardo. Representing Families of Cellular Automata Rules. *The Mathematica Journal* 16 (2014).
[14] Gerard 't Hooft. Duality between a deterministic cellular automaton and a bosonic quantum field theory in 1+1 dimensions. arXiv: 1205.4107
[15] T. Tokihiro, *et al*., From soliton equations to integrable cellular automata through a limiting procedure. *Phys. Rev. Lett.* Vol. 76 no. 18 (1996)
[16] Ralph Willox, *et al.* Solving the ultradiscrete KdV equation. Fast track communication. J. *Phys. A: Math. Theor.* 43 (2010) 482003. (IOP)
[17] Robert L. Kurucz. The Formation of Life. arXiv:astro-ph/0011209 (2000)
[18] S.I. Walker. Origins of Life: A Problem for Physics. arXiv: 1705.08073 (2017)

A Non-Particle View of DNA and Its Implication to Cancer Therapy

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Abstract. The various effects of electromagnetic fields to DNA have been reported by Luc Montagnier and his group. It has been shown that genetic information can be transmitted to water through applications of electromagnetic fields, means that DNA has wave character. Here, non-particle view of DNA challenges standard paradigm of DNA and biology. Based on frequency, it can have implications for physics of cancer.

INTRODUCTION

Over the last 60 years, the development of basic knowledge in biology as well as many medical applications owes much to the discoveries made in DNA. On the other hand, in the same times evidence has been accumulated on the influence of electromagnetic (em) fields on living organisms. The frequencies of involved em fields cover different intervals corresponding to the different scales present in the organisms. For example, in a series of reports by Prof. Luc Montagnier et al. which have caused debates all over the world, they showed that DNA has wave character. Luc Montagnier et al. discuss the appearance of a new property of DNA correlated with the induction of extremely low frequency (ELF) em fields. These fields can be induced by suitable procedures in water dilutions which become able to propagate the information contained in the DNA of the original organisms to other ones. Montagnier et al. considered a very low frequency (ELF) at the order of 7 Hz, which also occurs in nature, and it is known as Schumann resonance. In other paper, Montagnier et al. reported a novel property of DNA, that is the capacity of some sequences to emit electromagnetic waves in resonance after excitation by the ambient electromagnetic background. Owing to the low sensitivity and specificity of their signal capture and analysis, the frequencies emitted are all alike, regardless of the bacterial species involved. But their papers were based on experiments, and although a theoretical framework has been proposed, such experimental works seem to lack theoretical basis. Here, we give a theoretical basis of such a wave character of DNA based on De Broglie's matter-wave hypothesis. We prove that this matter-wave hypothesis can be interpreted such that all matter including DNA can be altered by (electromagnetic) frequencies. Nonetheless, it should be noted that other theoretical model has been proposed to explain Montagnier's experiment with liquid water [12]. In the mean time, there are related findings dating back to the 1920s which had shown the existence of emissions from living substances at the much higher frequency range of ultraviolet light. Such emission was later confirmed by Fritz-Albert Popp, a biophysicist, who named the phenomenon biophotons. Popp and colleagues demonstrated that the light was coherent, somewhat like a laser, that the emitting molecules are coupled by a coherent radiation field; and that the source is the DNA in the cell nucleus. Whole body biophoton detection in Popp's lab showed a correlation with known biological rhythms of diurnal, lunar, and other periodicity, and suggested the existence of a globally organized biophoton field for the organism. And biophotons emitted from DNA have become an established fact. Nowadays, biophotonics is a very active field of research, and it may have medical implications including cancer therapy as well [11]. Significance of this paper: It is known that modern biology including molecular biology has a core assumption, that is corpuscular view of DNA. Such an atomistic model of DNA can be traced to have its root in particle physics. If the newly interpreted matter-wave hypothesis is true, then it implies that DNA has wave character, i.e. it can be altered and influenced by EM frequencies. It can be expected, that such a non-particle view of DNA can have impacts on all our understanding on physics of biology, including potential implications to cancer therapy too.

DNA AND DE BROGLIE'S MATTER-WAVE HYPOTHESIS

Experiments carried out by Montagnier group seem to suggest that genetic information can be transmitted to water via electromagnetic waves. This is very interesting since it challenges standard paradigm in biology [2][3]. This is also related to Gariaev's proposal of DNA wave genetic [4][5].

That cell has capability to communicate at a distance may be not surprising, since there are reports indicating that effect. But that electromagnetic field can transmit genetic information to water is interesting result which seems to bring us back to an old debate between corpuscular view and wave view of matter.

Let put aside objections on Einstein's special relativity and follow De Broglie's argument in his thesis:

$$E = \hbar f, \tag{1}$$

and

$$E = mc^2. \tag{2}$$

From equations (1) and (2) we get:

$$m = f\frac{\hbar}{c^2}. \tag{3}$$

In theory, it seems possible that E.M. field not only can transmit genetic information to water, but also E.M. frequency can alter genetic code. Here equations (4) give some hints to explain many phenomena related to Montagnier and Gariaev's experiments and may plausibly open new ways to treat DNA as quantum biocomputer [4].

PLAUSIBLE APPLICATION OF THE PROPOSED CONCEPT

To test the new concept of "all life comes from life through frequency" (*Omne vivum ex vivo via crebritudo*) which challenges the standard paradigm in biology, we suggest the following:

Let us define f as yield frequency, which is frequency where matter becomes wave, and a new parameter

$$k = \frac{\hbar}{c^2}. \tag{4}$$

Then equation (3) can be written as a ratio:

$$\frac{m}{f} = k. \tag{5}$$

In words, from the above equation we may predict that the ratio between a small mass m like photon with its yield frequency f is always a constant. The small mass here can be extended to neutrino, electron, muon etc.

One plausible application of this proposition is alternative method of cancer treatment using various frequencies. It is known that some frequencies like 444 Hz may kill cancer cell without destroying the normal cells. Such a method seems worthy to be investigated and developed further.

Montagnier and his group also use very low frequency such as 7.83 Hz, which seems to be closely related to the Schumann resonance of 7 Hz. Whether or not such a 7.83 Hz corresponds to ambient frequency of electromagnetic noise in water should be tested with experiments.

DNA AS PERTURBED SGE SOLITON

One of various models of DNA is using solitary wave [6]. Its use as a model of phyllotaxis systems including DNA has been proposed elsewhere [7][8][9][10]. Now, let consider Perturbed sine-Gordon equation (PSGE) as a model of interaction between soliton and external E.M. field.

Perturbed SGE comes in a variety forms. One common form is a damped and driven SGE [9]:

$$\Psi_{tt} + \Phi\Psi_t - \Psi_{zz} + \sin(\Psi) = F. \tag{6}$$

In addition, the following two versions of the perturbed SGE have been studied in the literature, including directly forced SGE

$$\Psi_{tt} - \Psi_{zz} + \sin(\Psi) = Mf(\omega t) \tag{7}$$

and damped and drived SGE

$$\Psi_{tt} - \Psi_{zz} + \sin(\Psi) = Mf(\omega t) - \alpha\Psi_t + \eta. \tag{8}$$

In the meantime, $(2 + 1)$D SGE with additional spatial coordinate y is defined as

$$\Psi_{tt} = \Psi_{xx} + \Psi_{yy} - \sin(\Psi). \tag{9}$$

Here, new insights may be expected in various biological fields.

CONCLUDING REMARK

In this paper, we prove that DNA has non-particle character in favor of experiments carried out by Luc Montagnier et al. We also propose an extension of the known adage: Omne vivum ex vivo to Omne Vivum ex Vivo via Crebritudo" (Eng.: every life comes from other life through frequency). We also discuss a mathematical model of DNA as solitary wave, which suggests that it is possible to alter its structure through external frequency. However, it should be noted here that theoretical basis for effects of (electromagnetic) frequency to DNA structure is far from clear. Further investigation in the proposed direction can be recommended.

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REFERENCES

[1] V. Christianto and Y. Umniyati, *DNA Decipher J.* **6**, 102-106 (2016)
[2] L. Montagnier, *J. Phys.: Conf. Series* **306**, 012007 (2011)
[3] L. Montagnier, *Electromagnetic Biology and Medicine J.* **34**, 106-112 (2015)
[4] P. Gariaev, *DNA Decipher J.* **1**, 025-046 (2011)
[5] M. Pitkanen, *DNA Decipher J.* **1**, 181-190 (2011)
[6] V. Christianto and Y. Umniyati, *DNA Decipher J.* **4**, 199-202 (2014)
[7] C. Nisoli, *Phys. Rev.* E **80**, 026110 (2009)
[8] S. Cuenda, A. Sanchez and N.R. Quintero, *Physica* D **223**, 214-221 (2006)
[9] V.G. Ivancevic and T.T. Ivancevic, *Sine-Gordon Solitons, Kinks and Breathers as Physical Models of Nonlinear Excitations in Living Cellular Structures*
[10] L.V. Yakushevich, *Nonlinear Phys. DNA* (Wiley-VCH Verlag GmBH and Co, Berlin, 2004)
[11] J. Popp and M. Strehle, *Biophotonics: Visions for better health care* (Wiley-VCH Verlag GmBH and Co, Berlin, 2006)
[12] E. Del Giudice, *J. Phys.: Conf. Series* **329**, 012001 (2011)

An introduction to "*spirit-filled medicine*"

(An exploration in Theology of Medicine)

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Abstract

In the light of the fact that proper discussion of theology of medicine is quite rare, this short article highlights the fundamental problem with modern (Western) medicine. China has taken a step forward by recognizing their cultural heritage called TCM. Of course it must be acknowledged that modern (Western) medicine has been very advanced, but also many problems such as side effects and also many toxic materials due to synthetic materials. It is also well known that chemotherapy has a chance to work at a miserable rate of less than 20%, so it is reasonable to argue that the 21st century requires a conceptual, new approach to treatment.

Introduction

About two weeks ago, a respected senior professor, Prof. Dr. Bambang Hidayat, a member of the Indonesian Academy of Sciences, sent an article to a group of academics. * In essence he asked: how our response should be to China's recent policies that want to facilitate the practice of treatment based on TCM (traditional Chinese Medicine) in a balanced way. See attachment section.

To what extent we can accept or not TCM and other traditional medicines will be discussed in this article.

TCM and other approaches

His concern is certainly understandable, given the current perception of society is that traditional medicine, often referred to as alternative medicine, is usually associated with shamanic practices or strange methods such as turtles, snakes, bruises etc., many of which have not passed any clinical trials.

But there are two important things that we should take note of Xi Jinping's new policy on TCM:

a. This policy starts from realizing that the cost of Western medicine is very expensive, mainly due to clinical trials of humans, so it is quite reasonable that the Chinese government wants to give more balanced attention to the Chinese medicine tradition.

b. Traditional Chinese medicine has grown for no less than 4000 years.

However, we shall also note that there are some reports that in Asia, liver cancer can be linked to the use of (excessive) herbal medicines. Of course this needs further study. (5)

Regarding some people's concerns about the removal of clinical trials, it seems the Chinese government is quite cautious, see the following quote:

> "Lixing Lao, director of Hong Kong University's School of Chinese Medicine, says that although traditional medicines will no longer need to go through clinical trials, the CFDA will still require remedies to undergo preclinical pharmacological testing and drug-toxicity studies in animals or cells to gain approval."(2)

Certainly it can be expected that the new policy will further strengthen the interest of people to develop and produce drugs based on herbs that have been known to be useful for thousands of years, rather than synthetic (artificial) substances that could potentially not be processed and become toxic.) (4)

In Indonesia, it is also known a variety of medicinal plants, and there are several apps that provide catalog of such live pharmacies. One of which can be called for example is gendola, which reportedly efficacious for diabetes, cancer, stroke, coronary heart, liver etc. Of course clinical trials are required for this gendola. (6)

The fundamental problem of modern medicine (Western)

There are several scientific authors who express vividly how fundamental the problem with modern (Western) medicine. The fundamental problem is commonly expressed with a *mechanistic* worldview as well as a Cartesian dualism philosophy. (1) (11).

Sheldrake has revealed that the mechanistic view is actually derived from Neo-Platonic philosophy, so it is not based on biblical teaching.

A similar argument was developed by Fritjof Capra in his famous book, The Turning Point. (8)

Similarly, Christian philosopher Alvin Plantinga has written a paper criticizing materialism. (12)

Unfortunately, however, the thinking of scientists from such disciplines often fails in the midst of massive dis-information (and advertising) that modern (Western) medicine has managed to address almost all human health problems. Is that true?

Let's take a look at the colonial post-reading of Gen. 2: 7 and some other texts.

The post-colonial reading of Gen. 2: 7

If we glance at Gen. 2: 7, we see at a glance that man is made up of the dust of the ground (*adamah*) which is breathed by the breath of life by God (*nephesh*). Here we can ask, does this text really support the Cartesian dualism view?

We do not think so, because the Hebrew concept of man and life is integral. The bottom line: it is not the spirit trapped in the body (Platonic), but the body is flowing in the ocean of spirit. (9) This means that we must think of as an open possibility for developing an integral treatment approach (Ken Wilber), or perhaps more properly called "**spirit-filled medicine**." (10).

Let's look at three more texts:

a. Gen. 1: 2, "The earth is without form and void, darkness over the deep, and the Spirit of God hovering over the waters." Patterns such as Adam's creation can also be encountered in the creation story of the universe. Earth and the oceans already exist (similar to adamah), but still empty and formless. Then the Spirit of God hovered over it, in the original text "*ruach*" can be interpreted as a strong wind (storm). So we can imagine there is wind/hurricane, then in the storm that God said, and there was the creation of the universe. From a scientific point of view, it is well known in aerodynamics that turbulence can cause sound (turbulence-generated sound). And primordial sound waves are indeed observed by astronomers.

b. Ps. 107: 25, "He said, he raised up a storm that lifted up his waves." The relation between the word (sound) and the storm (turbulence) is interactive. Which one can cause other. That is, God can speak and then storms, or the Spirit of God causes a storm. Then came the voice.

c. Ezekiel. 37: 7, "Then I prophesy as I am commanded, and as soon as I prophesy, it sounds, indeed, a crackling sound, and the bones meet with one another." In Ezekiel it appears that the story of the creation of Adam is repeated, that the Spirit of God is blowing (storm), then the sound of the dead bones arises.

The conclusion of the three verses above seems to be that man is made up of adamah which is animated by the breath or Spirit of God. He is not matter, more accurately referred to as spirit in matter. Like a popular song around 80s goes: "*We are spirits in the material world*." See also Amos Yong, (7). Therefore, it is inappropriate to develop only materialistic or Cartesian dualism treatment. We can develop a more integral new approach. (1)

The integral view of humanity and spirituality, instead of two-tiered Western view of the world, appears to be more in line with majority of people in underdeveloping countries, especially in Asia and Africa. See for instance the work by Paul Hiebert (14).

Among the studies supporting such an integral approach is the view that cells are waves, see the paper from Prof. Luc Montagnier. (13) (15). And also our paper on the wave nature of matter, as well as the possibility of developing a wave-based (cancer) treatment. (16) (17) **

Concluding remarks

This short article highlights the fundamental problem with modern (Western) medicine. China has taken a step forward by recognizing their cultural heritage called TCM. Of course it must be acknowledged that modern (Western) medicine has been very advanced, but also many problems such as side effects and also many toxic materials due to synthetic materials. It is also well known that chemotherapy has a chance to work for less than 20%, so it is reasonable to argue that the 21st century requires a conceptual, new approach to treatment.

We hope this short article may inspire younger generation of physicists and biologists to rethink and renew their approaches to Nature, and perhaps it may also help to generate new theories which will be useful for a better future of mankind.

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This paper is dedicated to our Lord and the Good Shepherd, Jesus Christ, whose works and ministry have inspired this paper.

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VC & FS

note:

* thanks to Prof. Dr. Bambang Hidayat, a member of the Indonesian Academy of Sciences

** Our paper on non-particle view of DNA was once presented at the 2016 ICTAP conference in Makassar by coauthor.

References:

(1) Rupert Sheldrake. The science delusion. Ebook version. Url: http://www.alice.id.tue.nl/references/Interview%20with%20Rupert%20Sheldrake.pdf

(2) David Gray. Reuters. Url: https://industrialsafetynews.com/index.php/2017/11/29/china-to-roll-back-regulations-for-traditional-medicine-despite-safety-concerns-nature-news-comment-2/

(3) David Gray. Reuters. Url: https://sg.finance.yahoo.com/news/drug-makers-interested-ancient-chinese-081800251.html

(4) https://www.reuters.com/article/uk-drugs-china-tcm/china-seeks-to-unlock-secrets-of-herbs-roots-idUSLNE80C01A20120113

(5) David Gray. Reuters. Url: https://www.pri.org/stories/2017-10-18/new-study-shows-liver-cancer-asia-linked-herbal-remedies

(6) mas Dewo. Gendola: obat dewa penakluk aneka penyakit. FMedia (Imprint agromedia pustaka)

(7) Amos Yong. The Spirit of Creation. Cambridge: Wm. B. Eerdmans Publ. co, 2011

(8) Fritjof Capra. The Turning Point. Url: https://en.wikipedia.org/wiki/The_Turning_Point_(book)

(9) in the vale of soul-making. Url: http://themathesontrust.org/papers/modernity/sheldrake-vale.pdf

(10) Ken Wilber. Integral medicine. Url: http://www.kenwilber.com/Writings/PDF/ForewordIntegralMedicine_OTHERS_2003.pdf

(11) Rupert Sheldrake. Setting science free from materialism. Url: http://www.wakingtimes.com/2013/10/25/setting-science-free-materialism/

(12) Alvin Plantinga. Against materialism. Url:
http://www.andrewmbailey.com/ap/Against_Materialism.pdf
(13) Luc Montagnier et al. http://iopscience.iop.org/article/10.1088/1742-6596/306/1/012007/meta; (13a) Luc Montagnier. DNA between physics and biology. url: http://omeopatia.org/upload/Image/convegno/VALERI-24-10-2011Relazione3.pdf
(14) Paul Hiebert. The Flaw of Excluded Middle. Journal of Missiology, 1982; [14a] Paul Hiebert. Transforming Worldviews. Mission Focus, Annual Review, 2002
(15) http://21sci-tech.com/Articles_2011/Winter-2010/Montagnier.pdf
(16) Victor Christianto & Yunita Umniyati. A non-particle view of DNA and implications to cancer therapy. Url:
http://www.academia.edu/29253942/A_Non-Particle_View_of_DNA_and_Its_Implication_to_Cancer_Therapy
(17) Victor Christianto & Yunita Umniyati. A few comments of Montagnier and Gariaev's works. DNA Decipher Journal. Url:
http://dnadecipher.com/index.php/ddj/article/download/102/112

Appendix: Nature News, 30 november 2017

China to roll back regulations for traditional medicine despite safety concerns

Article by David Gray from Reuters

Scientists fear plans to abandon clinical trials of centuries-old remedies will put people at risk.

The Chinese government is promoting traditional Chinese medicines as an alternative to expensive Western drugs.

Support for traditional medicine in China goes right to the top. President Xi Jinping has called this type of medicine a “gem” of the country’s scientific heritage and promised to give alternative therapies and Western drugs equal government support. Now the country is taking dramatic steps to promote these cures even as researchers raise concerns about such treatments.

From early next year, traditional Chinese medicines may no longer be required to pass safety and efficacy trials in humans in China. Draft regulations announced in October by the China Food and Drug Administration (CFDA) mean traditional medicines can skip such costly and time-consuming trials as long as manufacturers prepare ingredients using essentially the same method as in classic Chinese formulations. The State Administration of Traditional Chinese Medicine and the CFDA will compose a list of the approved methods.

The Chinese government has been forcefully promoting traditional Chinese medicines (TCMs) as an alternative to expensive Western drugs. Doctors of Chinese medicine have welcomed the new policy, saying that it will make it easier for companies who produce such medicines to get drugs approved and make them available to patients. Lixing Lao, director of Hong Kong University's School of Chinese Medicine, says that although traditional medicines will no longer need to go through clinical trials, the CFDA will still require remedies to undergo preclinical pharmacological testing and drug-toxicity studies in animals or cells to gain approval.

Safety concerns

But scientists say that safety concerns continue to plague the industry, and that minimizing clinical-trial requirements could put more patients at risk. On 23 September, the CFDA recalled batches of two injectable TCMs after about ten people fell ill with fevers and chills.

Less than a month later, on 18 October, researchers in Singapore and Taiwan published a study in Science Translational Medicine linking liver cancer to aristolochic acid, an ingredient widely used in traditional remedies1. Lead author Steven Rozen, a cancer-genomics researcher at Duke-NUS Medical School in Singapore, is convinced that aristolochic acid contributed to the mutations, but says it's harder to determine to what extent it caused the tumours.

Aristolochic acid has also been linked to cancers of the urinary tract and can cause fatal kidney damage2, 3. Rozen says it is still in common use, despite warnings from the US Food and Drug Administration that it is associated with kidney disease. "It would be a good time to reassess regulations" of aristolochic acid, he says.

Lao sees people take remedies containing aristolochic acid every day, and says it should not cause problems if taken “moderately and to treat diseases” rather than as a regular supplement. He says more research is needed into how to ensure the safe use of the potentially toxic substance. Overall, Lao is not concerned about safety issues with traditional medicines because, “unlike Western drug development, these herbal formulas have been used for hundreds and thousands of years,” he says.

But Li Qingchen, a paediatric surgeon at the Harbin Children’s Hospital and a well-known critic of TCMs, says the recent recalls of remedies show that current safety measures aren’t adequate. He says doctors need to inform the public about some of the dangers associated with traditional medicines, but that most are unwilling to speak out against them. “Few doctors would dare to publicly criticize TCMs,” he says. Li thinks that the government’s promotion of TCMs will make it harder for scientists to criticize the drugs “because the matter gets escalated to a political level and open discussions become restricted”.

Criticism muted

With strong government support for the alternative medicines industry, Chinese censors have been quick to remove posts from the Internet that question its efficacy. On 23 October, an article on a medical news site that called for closer attention to the risks of aristolochic acid was removed from social media site WeChat. The story had been viewed more than 700,000 times in three days.

Debate over TCMs has been silenced before in China. Last year, a Beijing think tank — the Development Research Center of the State Council — proposed banning the practice of extracting Asiatic black bear bile, another common ingredient in TCMs. The think tank’s report questioned the remedy’s efficacy and suggested using synthetic alternatives. It was removed from the think tank's website after the Chinese Association of Traditional Chinese Medicine, which supports the development of TCM, called it biased and demanded an apology.

As well as reducing regulations for TCMs, the Chinese government has made it easier to become a doctor of traditional medicine and to open hospitals that use the approach. Since July 2017, students studying traditional medicine no longer need to pass the national medical exams based on Western medicine.

Instead, traditional medicine students can attend apprenticeship training and pass a skills test. And practitioners who want to open a clinic no longer need approval from the CFDA. They need only register with the authority.

The government's ultimate goal is to have all Chinese health-care institutions provide a basic level of TCMs by 2020. A roadmap released in February 2016 by the State Council, China's highest administrative body, plans to increase the number of TCM-licensed doctors to 4 per 10,000 people, an increase from less than 3 practitioners per 10,000 people. The government also wants to push TCMs' share of pharmaceutical sales from 26% to 30% by the end of the decade.

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References

Ng, A. W. T. et al. Sci. Transl. Med. 9, eaan6446 (2017).
Vanherweghem, J. L., et al. Lancet 341, 387–391 (1993).
Lord, G. M. et al. Lancet 358, 1515–1516 (2001).

A Review of Two Derivations of Maxwell-Dirac Isomorphism and a Few Plausible Extensions

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Abstract

The problem of the formal connection between electrodynamics and wave mechanics has attracted the attention of a number of authors, especially there are some existing proofs on Maxwell-Dirac isomorphism. Here the author will review two derivations of Maxwell-Dirac isomorphism i.e. by Hans Sallhofer and Volodimir Simulik. A few plausible extensions will be discussed too.

Introduction

There are some papers in literature which concerned with the formal connection between classical electrodynamics and wave mechanics, especially there are some existing proofs on Maxwell-Dirac isomorphism. Here the author will review two derivations of Maxwell-Dirac isomorphism i.e. by Hans Sallhofer and Volodimir Simulik.

While we are aware that the papers of those mentioned authors are quite old, we will discuss some recent papers which seem to point out to new development in classical electrodynamics, for instance the use of quaternion algebra and also the notion of longitudinal wave solution of Maxwell equations.

Hans Sallhofer's method

Summing up from one of Sallhofer's papers[1], he says that under the sufficiently general assumption of periodic time dependence the following connection exists between source-free electrodynamics and wave mechanics:

$$\sigma \cdot \begin{bmatrix} rotE + \frac{\mu}{c}\frac{\partial}{\partial t}H = 0 \\ rotH - \frac{\varepsilon}{c}\frac{\partial}{\partial t}H = 0 \\ div\,\varepsilon E = 0 \\ div\,\mu H = 0 \end{bmatrix}_{divE=0} \equiv \left[(\gamma \cdot \nabla + \gamma^{(4)}\partial_4)\Psi = 0\right] \tag{1}$$

In words: Multiplication of source-free electrodynamics by the Pauli-vector yields wave mechanics.[1] In simple terms, this result can be written as follows:

$$P \cdot M = D, \tag{2}$$

Where:

P = Pauli vector,

M = Maxwell equations,

D = Dirac equations.

We can also say: Wave mechanics is a solution-transform of electrodynamics. Here one has to bear in mind that the well-known circulatory structure of the wave functions, manifest in Dirac's hydrogen solution, is not introduced just by the Pauli-vector.[1]

Volodimir Simulik's method

Simulik described another derivation of Maxwell-Dirac isomorphism. In one of his papers[2], he wrote a theorem suggesting that the Maxwell equations of source-free electrodynamics which can be written as follows:

$$
\begin{aligned}
&rotE + \frac{\mu}{c}\frac{\partial}{\partial t}H = 0 \\
&rotH - \frac{\varepsilon}{c}\frac{\partial}{\partial t}H = 0 \\
&\quad divE = 0 \\
&\quad divH = 0
\end{aligned}
\tag{3}
$$

Are equivalent to the Dirac-like equation [2]:

$$
\left[\gamma.\nabla - \begin{pmatrix} \varepsilon 1 & 0 \\ 0 & \mu 1 \end{pmatrix}\frac{1}{c}\frac{\partial}{\partial t}\right]\Psi^{c1} = 1, \tag{4}
$$

Where in the usual representation

$$
\gamma = \begin{pmatrix} 0 & \sigma \\ \sigma & 0 \end{pmatrix}, \tag{5}
$$

And σ are the well-known Pauli matrices.

A few plausible extensions of Maxwell-Dirac isomorphism

a. It is known that the original Maxwell equations were expressed in quaternion algebra, instead of vector language, so there is a kind of revival from time to time to recover the original quaternionic Maxwell equations. With the help of Gersten's decomposition method, we were able to derive Maxwell equations in Quaternion space starting from quaternionic Dirac equations.[4]

   We started with a basic assumption of quaternionic square root as follows [4]:

$$
k = \left(E_{qk} + i\vec{p}_{qk}\right)q_k \tag{6}
$$

   Then we proceed with Gersten's decomposition method to re-derive Maxwell from quaternionic Dirac equation. This approach seems quite worthy for further investigations.

b. Further improvement may be expected, for example to alter slightly the Maxwell equations by using gradient magnetic field. This has been explored by Simulik recently[4], and he was able to prove the existence of longitudinal wave. More specifically, he considers the following set of equations:

$$\partial_0 \vec{E} - curl\vec{H} = -gradE^0, \quad (7)$$

$$\partial_0 \vec{H} - curl\vec{E} = -gradH^0, \quad (8)$$

$$div\vec{E} = -\partial_0 E^0,$$

(9)

$$div\vec{H} = -\partial_0 H^0. \quad (10)$$

Concluding remarks

The problem of the formal connection between electrodynamics and wave mechanics has attracted the attention of a number of authors, especially there are some existing proofs on Maxwell-Dirac isomorphism. Here the author reviews two derivations of Maxwell-Dirac isomorphism i.e. by Hans Sallhofer and Volodimir Simulik. A few plausible extensions are discussed too, for example the use of quaternion algebra and also an extension to include longitudinal wave.

This paper was inspired by an old question: Is there a consistent and realistic description of wave function, both classically and quantum mechanically?

It can be expected that the above discussions will shed some lights on such an old problem especially in the context of physical meaning of quantum wave function. This is reserved for further investigations.

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References:

[1] Hans Sallhofer. Elementary Derivation of the Dirac equation. X. *Z. Naturforsch*. 41a, 468-470 (1986)
[2] Volodimir Simulik. Some Algebraic Properties of Maxwell-Dirac Isomorphism. *Z. Naturforsch*. 49a, 1074-1076 (1994)
[3] Volodimir Simulik. Longitudinal electromagnetic waves in the framework of standard classical electrodynamics. arXiv: 1606.01738 (2016)
[4] Victor Christianto & Florentin Smarandache. A derivation of Maxwell equations in Quaternion Space. Progress in Physics vol. 2, April 2010. url: http://www.ptep-online.com

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VC

A Computer Algebra Solution of Ermakov Equation Corresponding to Diffusion Interpretation of Wave Mechanics

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ABSTRACT

It has been long known that a year after Schrödinger published his equation, Madelung also published a hydrodynamics version of Schrödinger equation. Quantum diffusion is studied via dissipative Madelung hydrodynamics. Initially the wave packet spreads ballistically, than passes for an instant through normal diffusion and later tends asymptotically to a sub-diffusive law. In this paper we will review two different approaches, including Madelung hydrodynamics and also Bohm potential. Madelung formulation leads to diffusion interpretation, which after a generalization yields to Ermakov equation. Since Ermakov equation cannot be solved analytically, then we try to find out its solution with *Mathematica* package. It is our hope that these methods can be verified and compared with experimental data. But we admit that more researches are needed to fill all the missing details.

Keywords: quantum hydrodynamics, quantum diffusion, quantum-classical correspondence, Madelung equation, Ermakov equation, computer algebra solution.

1. Introduction

The Copenhagen interpretation of quantum mechanics is guilty for the quantum mystery and many strange phenomena such as the Schrödinger cat, parallel quantum and classical worlds, wave-particle duality, decoherence, collapsing wave function, etc.

The Copenhagen interpretation of QM was challenged not only by Schrödinger but also by a large group of physicists led by Albert Einstein who claimed that the quantum mechanical description of the physical reality cannot be considered complete, as shown in their famous EPR paper Einstein, Podolsky and Rosen. They concluded their derivations by stating that "*While we have thus shown that the wave function does not provide a complete description of the physical reality, we left open the question of whether or not such a description exists. We believe, however that such a theory is possible.*" Einstein did not object to the probabilistic description of sub-atomic phenomena in quantum mechanics. However, he believed that this probabilistic representation was a technique used to overcome the practical difficulties of dealing with a more complicated underlying physical reality, much in the same way he suggested earlier to deal with Brownian motion.

Many scientists have tried, however, to put the quantum mechanics back on *ontological* foundations. For instance, Bohm proposed an alternative interpretation of quantum mechanics, which is able to overcome some puzzles of the Copenhagen interpretation. He developed further the de Broglie pilot-wave theory and, for this reason, the Bohmian mechanics is also known as the de Broglie-Bohm theory.[2]

Long before the Bohmian mechanics proposal, a year after Erwin Schrödinger published his celebrated equation, Erwin Madelung showed (in 1927) that it can be written in a hydrodynamic form. Madelung's representation has a seemingly major disadvantage by transforming the linear Schrödinger equation into two nonlinear ones. Nonetheless, despite of its additional complexity, the hydrodynamic analogy provides important insights with regard to the Schrödinger equation.

Quantum diffusion is studied via dissipative Madelung hydrodynamics. Initially the wave packet spreads ballistically, than passes for an instant through normal diffusion and later tends asymptotically to a sub-diffusive law.

Quantum diffusion (QD) describes a wave packet spreading in a dissipative environment at zero temperature. Since quantum effects are significant for light particles mainly, QD is very essential for electrons, which on the other hand are very important in physics and chemistry. QD has been experimentally observed, however, for muons as well, which are about 200 times heavier than electrons. Studies on electron transport in solids are strongly motivated by the semiconductor industry, exploring nowadays quantum effects on nano-scale.[4]

Another important transport process affected by quantum effects is the diffusion of hydrogen atoms or molecules in metals and on solid surfaces. The quantum tunneling accelerates the hydrogen diffusion, which is essential for many modern technologies for storage and use of hydrogen as a fuel, chemical reagent, etc.[4]

In this paper we will review two different approaches, including Madelung hydro-dynamics and also Bohm potential. It can be shown that Madelung formulation leads to diffusion interpretation, which after a generalization yields to Ermakov equation. Since Ermakov equation cannot be solved analytically, then we try to find out its solution with *Mathematica* package. It is our hope that these methods can be verified and compared with experimental data. For other papers discussing the use of Ermakov equation in QM, see [8]-[12].

Nonetheless, we admit that more researches are needed to fill all the missing details, for example we do not yet discuss comparison between quantum trajectories and classical trajectories such as in Wilson chamber experiments.

2. Bohmian quantum potential [2]

The evolution of the wave function of a quantum mechanical system consisting of N particles is supposed to be described by the Schrödinger equation:

$$i\hbar\partial_t\psi = \left(-\frac{\hbar^2}{2m}\nabla + U\right)\psi. \tag{1}$$

The complex wave function can be presented generally in the polar form:

$$\psi = \sqrt{\rho}\exp\left(\frac{iS}{h}\right), \tag{2}$$

Where $\rho = |\psi|^2$ is the N-particles distribution density and $\frac{S}{\hbar}$ is the wave function phase.

Introducing equation (2) into (1) one gets a set of equations:

$$\partial_t\rho = -\nabla.(\rho\nabla S / m), \tag{3}$$

$$\partial_t S + \frac{(\nabla S)^2}{2m} + U + Q = 0, \tag{4}$$

Where quantum potential, Q, is defined as follows:

$$Q = -\frac{\hbar^2}{2m^2}\frac{\nabla^2\sqrt{\rho}}{\sqrt{\rho}}. \tag{5}$$

Equation (5) is called Bohmian quantum potential.[2]

3. Madelung quantum potential[2]

If one starts with a different assumption that in equation (3) S is the hydrodynamic-like velocity potential, not the mechanical action as suggested by Bohm, then he can arrives at different relations, such as the two equations proposed by Madelung as follows:

$$\partial_t \rho = -\nabla.(\rho V), \tag{6}$$

$$m\partial V + mV \cdot \nabla V = -\nabla(U + Q), \tag{7}$$

Where

$$V = \nabla S / m. \tag{8}$$

Equations (6) and (7) are known as the Madelung quantum hydrodynamics.[2]

4. Quantum Diffusion and Ermakov equation. Numerical solution

Quantum diffusion is studied via dissipative Madelung hydrodynamics. Initially the wave packet spreads ballistically, than passes for an instant through normal diffusion and later tends asymptotically to a sub-diffusive law.

Now, we start with Madelung equations (6)(7)(8), then introducing now both expressions for ρ and V in Eq. (7) yields the following equation:[4]

$$m\partial_t^2 \sigma + b\partial_t \sigma = \frac{\hbar^2}{4m\sigma^3},$$

(9)

describing the evolution of the root-mean-square displacement σ. Introducing new dimensionless dispersion and time parameters, Eq. (9) acquires the universal form of a dissipative Ermakov equation:

$$\partial_\tau^2 \xi + \partial_\tau \xi = \xi^{-3},$$

(10)

where

$$\xi^2 \equiv \frac{2b\sigma^2}{\hbar}$$

(11)

$$\tau = bt / m.$$

(12)

It is known that such an Ermakov equation cannot be solved analytically. In reference [4], solutions have been obtained for some limiting cases. Now we will try to find numerical solution using *Mathematica* package using NDSolve, as follows:

```
ODE=x''[t]+x'[t]-1/x[t]^3==0;
sol=NDSolve[{ODE,x[0]==1,x'[0]==1},x[t],{t,-10,10}]
Plot[x[t]/.sol,{t,-10,10}]
```

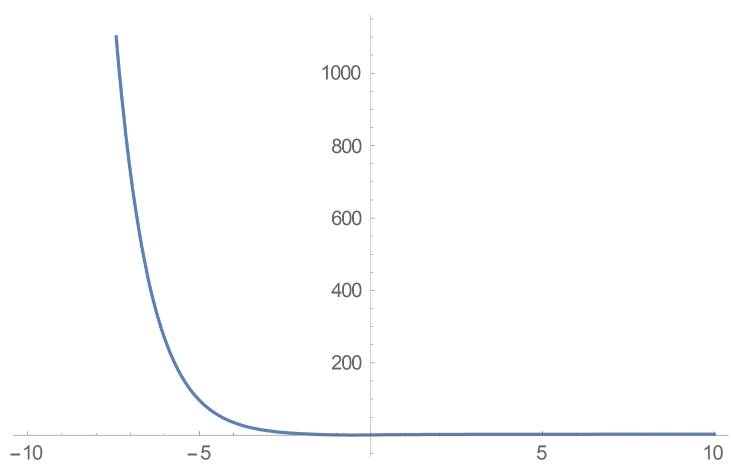

Figure 1. Plot for numerical solution of Ermakov equation

5. Discussion and Concluding Remarks

We have discussed two different approaches, including Madelung hydrodynamics and also Bohm potential. Madelung formulation leads to diffusion interpretation, which after a generalization yields to Ermakov equation. Since Ermakov equation cannot be solved analytically, then we try to find out its solution with *Mathematica* package.

We have obtained numerical solution of Ermakov equation corresponding to diffusion interpretation of QM. For other papers discussing the use of Ermakov equation in QM, see [8]-[12].

It is our hope that these methods can be verified and compared with experimental data. Nonetheless, we admit that more researches are needed to fill all the missing details, for example we do not yet discuss comparison between quantum trajectories and classical trajectories such as in Wilson chamber experiments.

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References

[1] Robert E. Wyatt. *Quantum Dynamics with Trajectories: Introduction to Quantum Hydrodynamics.* New York: Springer Science + Business Media, Inc., 2005

[2] Roumen Tsekov. Bohmian mechanics versus Madelung quantum hydrodynamics. *Ann. Univ. Sofia, Fac. Phys. Special Edition* (2012) 112-119 [arXiv 0904.0723]

[3] ______. Complex quantum hydrodynamics with teleportation. *New Adv. Phys*. 8 (2014) 111-121 [arXiv 1301.7537]
[4] _______. Quantum Diffusion. *Phys. Scr.* **83** (2011) 035004 [arXiv 1001.1071]
[5] V.V. Kulish & J.L. Lage. On the Relationship between Fluid Velocity and de Broglie'sWave Function and the Implications to the Navier–Stokes Equation. *International Journal of Fluid Mechanics Research*, Vol. 29, No. 1, 2002.
[6] Eugen Merzbacher. *Quantum Mechanics.* 3rd ed. New York: John Wiley & Sons, Inc., 1998.
[7] James M. Feagin. *Quantum Methods with Mathematica.* New York: Springer-Verlag, 1994.
[8] Erwin Suazo, Sergei K. Suslov, Jose M. Vega-Guzman. The Riccati system and a diffusion type equation. *Mathematics* 2014, 2, 96-118. URL: http://www.mdpi.com/journal/mathematics
[9] P.G. Leach & K. Andriopoulos. The Ermakov equation: a Commentary. *Appl. Anal. Discrete Math*. 2 (2008), 146-157.
[10] Dieter Schuch. Nonlinear quantum mechanics, complex classical mechanics and conservation laws for closed and open systems. *J. of Phys: Conf. Series* 361 (2012) 012020.
[11] Jose F. Carinena. A new approach to Ermakov systems and applications in quantum physics. The European Physical Journal Special topics – July 2008. Obtained from ResearchGate.
[12] Panayotis G. Kevrekidis & Yannis Drossinos. Nonlinearity from linearity: The Ermakov-Pinney equation revisited. *Mathematics and Computers in Simulation* 74 (2007) 196-202.

On Plausible Role of Classical Electromagnetic Theory and Submicroscopic Physics to understand and enhance Low Energy Nuclear Reaction (LENR): A Preliminary Review

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Abstract

In this paper we will discuss how we can study some effects associated with LENR from the principles of classical electromagnetic theory and also from a very new approach based on the submicroscopic concept of physics. Perhaps our considerations have their own risks because the majority of mainstream physicists consider nuclear fusion rather as a phenomenon associated with tunneling through a Coulomb barrier, which is a pure quantum effect. We will discuss that there are some aspects of Classical electromagnetic theories which may have impact on our understanding on LENR phenomena, including: a. nonlinear electrostatic potential as proposed by Eugen Andreev, b. vortex sound theory of Tsutomu Kambe, c. nonlinear ponderomotive force, and d. submicroscopic consideration.

Introduction

Since Pons & Fleischmann reported their experiments around 1989, many labs in the world tried to replicate their results, but many failed. Thereafter, there was a wave of rejection to their claim that table-top nuclear fusion at room temperature is possible. Some establishment physicists even called "cold fusion" idea as *pathological science*. But many non-mainstream physicists and chemists continued their works in underground manner. And some eminent physicists have taken risks to join this underground movement, including Prof. Hagelstein from MIT.

But the rejection of mainstream physics towards cold fusion/LENR remain strong. Even the famous Prof. Brian Josephson from Cavendish Lab in Cambridge University was denied access from arXiv server because of his endorsement to E. Storm's works. He went on to write a paper suggesting that such a denial of many successful experiments related to cold fusion/LENR can be called "*pathological disbelief*."

In this context, allow us to recall a story that was told to the first author (VC) several times by Dr. Iwan Kurniawan, a nuclear engineer from Indonesia.[1] When he was a doctoral student in a University in Japan around 1990s, his professor invited him to do experiment related to cold fusion in physics lab. After setting all the apparatus properly, they went home. In the morning, they were surprised that all the apparatus was blown up and it damaged the window glasses in lab. Dr. Iwan told VC that since then he concluded that cold fusion does not work as claimed by Pons & Fleischmann.

He is one of my good friends for a long time, and VC and him often discussed many things. But regarding his cold fusion experiment in lab, we got a different opinion: the fact that the apparatus blew the entire lab indicates that there was huge energy in the device, so huge that it damaged the window glasses. The problems appear to come from at least two aspects: a. poorly understood mechanism of the reaction, and b. the reactor failed to work properly. So, it is basically similar to reactor meltdown in a usual fission reactor. We need to learn what makes their cold fusion reactor failed. It is not because there is no energy inside the system, but it is really because there is so huge energy. Reactor shutdown has recently been admitted as one of the real problems in many LENR reactors, and this is a challenge for experimenters and companies who want to design commercial LENR reactors.[8-10]

However, in this paper we will not repeat such debates that have been discussed many times elsewhere. Instead we will discuss how we can study some effects associated with LENR from the principles of classical electromagnetic theory. We are aware that this approach has its own risks, because many physicists consider that nuclear fusion should be associated with tunneling through Coulomb barrier, and this kind of tunneling is a pure quantum effect. Is that true?

We will discuss that there are some aspects of Classical electromagnetic theories which may have impact on our understanding on LENR phenomena, including: a. nonlinear electrostatic potential as proposed by Eugen Andreev, b. vortex sound theory of Tsutomu Kambe, c. nonlinear ponderomotive force, d. submicrosopic consideration. Regarding ponderomotive force, it has been proposed recently by Lundin & Lidgren in order to understand the mechanism of LENR. [13][14]

It is our hope that this paper will motivate young electrical engineers to study LENR phenomena from new perspectives starting from classical electromagnetics theories. In

[1] Special thanks to Dr. Iwan Kurniawan for telling his first-hand experiment with cold fusion. Wishing you will be recovered soon, brother!

short, classical electromagnetic theories still offer many surprises to those who are willing to dig deeper into the hidden mysteries of Nature.

a. Nonlinear electrostatic potential of Eugen Andreev

In modern physics, there is a firm conviction based on the vast empirical material that:

- The electromagnetic and nuclear interactions are of a different nature;
- The field of electric charge (proton, electron) is spherically symmetric;
- The nucleon-nucleon forces depend on the direction.

In his paper, Andreev [1] suggested a hypothesis that the notion of the nuclear interaction could be interpreted as a nonlinear distribution of the electrostatic potential, which manifests itself at the Fermi scale. An analytical form of the potential of the proton is proposed, which coincides with conventional forms used in the nuclear physics at a short scale, but becomes the usual Coulomb potential at a large scale.

The model potential possesses a set of properties that could be called "*nuclear van der Waals forces.*"

Coulomb's law can be written in integral form as follows:[1]

$$\varphi(x,y,z)=\frac{k\varphi}{R}=-k\iiint_{v}\frac{div(\nabla\varphi(x,y,z))dV}{\sqrt{(x^2+y^2+z^2)}} \tag{1}$$

If we replace R with R_{dd}, which is defined as follows:

$$R_{dd}=\sqrt{x^2+y^2+\beta^2z^2+r_o{}^2} \tag{2}$$

Then we will have a two parameter field potential: [1]

$$\phi(x,y,x,\beta,r_0)=\frac{\phi}{R+r_0}, \tag{3}$$

Or

$$\phi(x,y,z,\beta,r_0)=[\varphi].\left(\frac{k_1}{R_{dd}}+\frac{k_2}{\left|R_{dd}\right|^2}\right) \tag{4}$$

As a result, we have obtained an explicit analytic form of the *electronuclea*r potential of a proton:[1]

$$\phi_{(proton)}=\frac{r_0}{\sqrt{(x^2+y^2+2z^2+r_o^2)}}+\frac{dz.r_0^2}{(x^2+y^2+2z^2+r_o^2)} \tag{5}$$

Thus, the general form of the potential well, due to the specific distribution of the charge density inside the proton, reminds us to the *van der Waals interaction*.

The above result is quite significant, because it explained Coulomb barrier suppression starting from classical electromagnetics theory. Furthermore, Andreev has shown that PP potential as described above can be compared with:[1]

- Lennard-Jones potential (resulting from the van der Waals interaction):

$$V_{LJ} = \frac{0.01}{r^{12}} - \frac{1}{r^5} \tag{6}$$

- Reed potential:

$$V_{\mathrm{Re}ed} = -10\frac{e^{-r}}{r} - 1650\frac{e^{-4r}}{r} + 6484\frac{e^{-7r}}{r} \tag{7}$$

b. Vortex sound theory of Tsutomu Kambe [2][3][4]

The above electronuclear potential starts with electrostatics/Maxwell equations. Now it is very interesting to remark here that Prof. T. Kambe from University of Tokyo has made connection between equation of vortex sound and fluid Maxwell equations.

He wrote that it would be no exaggeration to say that any vortex motion excites acoustic waves.

He considers the equation of vortex sound of the form: [2]

$$\frac{1}{c}\partial_t^2 p - \nabla^2 p = \rho_0 \nabla . L = \rho_0 div(\omega \times v) \tag{8}$$

He also wrote that dipolar emission by the vortex-body interaction is:[3]

$$p(x,t) = -\frac{P_0}{4\pi c}\pi_i\left(t - \frac{x}{c}\right)\frac{x_c}{x^2} \tag{9}$$

Then he obtained an expression of fluid Maxwell equations as follows:

$$\begin{aligned} \nabla \cdot H &= 0 \\ \nabla \cdot E &= q \\ \nabla \times E + \partial_t H &= 0 \\ a_0^2 \nabla \times H - \partial_t E &= J \end{aligned} \tag{10}$$

Where :

a_0 denotes the sound speed, and

$$q = -\partial_t (\nabla \cdot u) - \nabla \hbar,$$
$$J = \partial_t^2 v + \nabla \partial_t h + a_o^2 \nabla \times (\nabla \times v) \tag{11}$$

To our opinion, this new expression of fluid Maxwell equations suggests that there is deep connection between vortex sound and electromagnetic fields. Therefore, it may offer new ways to alter the form of electronuclear potential as described in the previous section.

For octonic formulation of fluid Maxwell equations, see [15]. For alternative hydrodynamics expression of electromagnetic fields, see [16].

c. Nonlinear ponderomotive force

According to Brechet et al. [6], a ponderomotive force results from the response of inhomogeneous matter fields to the presence of electromagnetic fields. Ponderomotive forces are generally overlooked since the electromagnetic community is not much concerned with continuum mechanics and the continuum mechanics community is not dealing usually with electromagnetic systems.

The nonrelativistic ponderomotive force as proposed by Miller (1958) is as follows: [7]

$$F = m\ddot{\bar{r}} = -\frac{q^2}{4m\omega^2} \nabla \left| \vec{E}(r,t) \right|^2 \tag{12}$$

Equation (12) can obviously be derived from the ponderomotive potential:

$$\phi_{(p)}(r,t) = \frac{q^2}{4m\omega^2} \left| \vec{E}(r,t) \right|^2 \tag{13}$$

Other than Miller's force, there are other types of ponderomotive forces ee: [5]

- Abraham force (1903),
- Barlow (1958),
- Lundin & Hultqvist (1989),
- Bolotovsky & Serov (2003).

It can be noted here that the Miller force is independent of wave frequency for $\omega^2 << \Omega^2$ and **attractive** for the entire frequency range below resonance. The Miller force is **repulsive** at frequencies above resonance, but decays strongly at higher frequencies.

Ponderomotive forcing by electromagnetic waves is capable of causing attraction of solid bodies.

Brechet et al. [6] discuss electromagnetic force density of magnetoelectric ponderomotive force, which is different from Miller's force.

In a recent paper, Lundin & Lidgren proposed that Miller ponderomotive force may offer an explanation to nuclear spallation as observed in some LENR experiments. Although their study is not yet conclusive, it opens an entirely new way to discuss LENR from purely classical electromagnetic theory.

d. Submicroscopic consideration

In monograph [11] it was presented a detailed structure of physical space (or a vacuum, ether), which is based on pure mathematical principles – set theory, topology and fractal geometry. The study shows that matter appears from a primary substrate that has a structure of a mathematical lattice named the tessellattice. Thus all massive particles as well as electrically charged particles emerge from the tessellattice as local distortions of its cells. At the motion such anamorphosis has to interact with the tessellattice, which is neglected in quantum mechanical, quantum field and electromagnetic theories. The bulk fractal deformation of a cell of the tessellattice is associated with the notion of mass; thought the surface deformation of a cell is related to the electric charge. Hence two kinds of equations should appear: one system of equations describes the behavior of a massive particle and one more system of equations depicts the behavior of the electric charge. The first system is quite new and presented in book [11] and it is related to the quantum mechanical formalism; the other system is reduced to the conventional Maxwell equations, which is also illustrated in book [11].

It has been demonstrated [11] that the interaction of a moving particle with the tessellattice results in the generation of a new kind of quasi-particles named 'inertons'. These inertons are carriers of massive properties of particles and they play in some sense the role of hidden variables introduced in physics by de Broglie, Bohm and Vigier. Inertons exchange by mass, speed and hence momentum and kinetic energy with the particle that generates them. A section of space known as the particle's de Broglie wavelength λ is the spatial amplitude of the particle. it is a section, in which the particle initially generates inertons and passing the whole kinetic energy to the generated cloud of inertons finally stops; then in the next section λ inertons guide the particle passing on to it their velocity, mass, momentum and kinetic energy.

The particle's inerton cloud together with the particle, which exist in the real space, are projected to the quantum mechanical formalism, which was developed in a phase space, as the particle's wave ψ-function. Thus, in a solid each atom is surrounded with its inerton cloud; the same for each free electron, proton or another canonical particle.

In the recent experiment [12] in a chamber filled with a gas a discharge has been generated. Positive ions of the gas reached the cathode where they interacted with atoms of the electrode made of tungsten. If the gas is hydrogen, discharges produce free protons in it. Reaching the cathode, protons interact with a metal matrix in such a way, that at the resonance conditions, i.e. when the momenta of the interacting atom and proton are coincide by the absolute value and have opposite directions, i.e. the proton impacts the tungsten atom being in antiphase oscillating in its site of the crystal lattice, both particles must stop, $m_{\rm p}\vec{u}_{\rm p} + m_{\rm W}\vec{u}_{\rm W} = 0$. This condition means that the proton knocks out the tungsten's atom inerton cloud.

One of free electrons available at the surface of the electrode absorbs the tungsten atom's inerton cloud and also traps a proton. The merging of the heavy electron with the proton results in the creation of a super heavy hydrogen atom. In this system the reduced mass of the proton and the electron is almost equal to $m_{\rm p}$ (in fact $1/m_{\rm p} + 1/(m_{\rm e} + m_{\rm W}) \cong 1/m_{\rm p}$). Therefore the proton starts to rotate around the heavy electron; the Bohr radius for the rotating proton is

$$r_{\text{p-e}} = \frac{4\pi\varepsilon_0 \hbar^2 n^2}{e^2 m_{\rm p}} = 2.88 \times 10^{-14} \text{ m}, \tag{14}$$

where we put $n = 1$. Though the electron orbit (14) deeply penetrates into the middle of the proton, the electron still does not reach the critical distance of 2×10^{-14} m that characterizes the quark orbit inside the proton [11]. If we put $n = 2,\ 3$, the radius (14) will be larger but still in the order of femtometers.

What is interesting, these small atoms named subatoms [12] behave like neutrons, namely, neutron detectors measured the presence of neutrons in the experiment conducted. We [12] were able to generate subatoms, such as subhydrogen and subhelium (in a helium atmosphere), which were perceived by the neutron detector as real neutrons. The intensity of the measured "neutron" radiation was rather significant; the maximum value measured by the detector was 3×10^5 neutrons/(cm^2·min). Nevertheless, the real intensity could even be 5 orders higher. Besides, analyzing our experiments, we came to the conclusion about the existence of other tiny systems: subdeuterium, neutral {deuteron + subhydrogen} pair, and neutral {deuteron + subhelium} pair.

Many other researchers reported about similar very small stable atoms, or combined particles, though were unable to explain their structure and properties.

All these nuclear systems had the size around several units of 10^{-14} nm. They can be generated artificially in a chamber filled with a gas. When in the chamber a discharge is generated, positive ions of the gas reaches the cathode where they interact with atoms of the electrode, typically made of tungsten.

When we launch the production of subatoms and the mentioned nuclear pairs, at the high intensity of these entities we are able to anticipate the real transformation of nuclei in the system studied. Indeed, tiny subatoms and nuclear pairs (with the size $\le 5\cdot10^{-14}$ m) can easy to penetrate a shell of electrons around each atom, which have a size around 10^{-10} m.

In other words, a subatom or nuclear pair moving to the nucleus of the atom studied will pierce the electron shell similarly to a spaceship that is travelling in our solar system. Any electron of the electron shell cannot experience this pinhole because of the incommensurability of the sizes of tiny particles and electron orbits.

Approaching a nucleus, a subatom or nuclear par starts interacting with nuclides: a subatom brings to the nucleus a thermal proton (deuteron or α particle), the inerton cloud and electron. The electron will be getting away from the nucleus because it does not participate in nuclear reactions. But the proton (deuteron or α particle) will bring an additional interaction inside the nucleus, which has to result in its mutation.

In fact, studying samples of iron and samples of water contaminated with Cesium-137 we [11] revealed significant mutations in iron (in which emerged such elements, as Co, Ni, Ca, Hf, Cs) and decrease in radioactivity of the water sample up to 30-40% at the application of an inerton field. It seems in those experiments initially subatoms had formed that then influenced nuclei of Fe (in samples of iron) and nuclei of Cs-137 (in samples of water contaminated with radioactive cesium).

Discussion & Concluding Remarks

We have discussed a new expression of electronuclear potential starting from electrostatics law. This explains Coulomb barrier suppression from purely classical origin, without the use of nuclear potential such as Woods-Saxon potential. The model potential possesses a set of properties that could be called "*nuclear van der Waals forces*." In our opinion, this is a quite surprising result that offers a novel way to explain low energy nuclear reaction (LENR) from Classical Electromagnetic theories.

Moreover, Kambe's new expression of fluid Maxwell equations suggests that there is deep connection between vortex sound and electromagnetic fields. Therefore, this result may offer a new insight on how to alter the electronuclear potential using vortex sound equation. This requires further investigations.

In a recent paper, Lundin & Lidgren proposed that Miller ponderomotive force might offer an explanation to nuclear spallation as observed in LENR experiments. Although their study is not yet conclusive, it opens an entirely new way to discuss LENR from purely classical electromagnetic theories.

The electrostatic/electronuclear potentials, fluid Maxwell equations and ponderomotive force have been proposed as an alternative to tunneling effects that could occur at a quantum mechanical consideration of LENR. However, in section d we have shown that the tunneling effect itself can be considered in deeper terms, namely from the submicroscopic point view. This is a quite new approach to the description of physical phenomena, which however, promise a lot in both our understanding of mysterious phenomena of nature and the modeling of some crucial experiments, such LENR or similar.

As follows from the submicroscopic concept, LENR can be possible only in the case when subatoms or nuclear pairs emerge in the system studied. An efficiency of LENR is directly proportional to the quantity of generated subatoms and nuclear pairs. That is why it seems to reach the highest efficiency in LENR can be possible at the following two main conditions: (i) in a reaction chamber one has to increase the number of subatoms and nuclear pairs to the value of no less than 10^{12}; at this quantity of deuterons in a macroscopic sample reactions $d + d =$ He produces heat comparative to a room temperature; (ii) there should be invented a mechanism(s) that would stimulate collisions of subatoms and nuclear pairs with potential targets and between themselves.

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References:

[1] Eugen Andreev. 2015. About the Coulomb barrier in LENR processes. URL: http://www.e-catworld.com

[2] Tsutomu Kambe. 2010. Vortex sound with special reference. *Int. J. Aeroacoustics* vol. 9 no. 1&2.

[3] _______. 2004. Theory of vortex sound with special reference to vortex rings. *Int. Conf. on Math. Fluid Dy*n., Dec. 2004

[4] _______. New formulation of equations of compressible fluids on analogy of Maxwell equations.

[5] Rickard Lundin & A. Guglielmi. 2006. Ponderomotive force in cosmos. *Space Science Review* (2006) 127:1-116

[6] Sylvain D. Brechet, A. Roulet., J.P. Ansermet. 2013. Magnetoelectric Ponderomotive force. *Modern Phys. Lett.* B Vol. 27 no. 21

[7] D. Bauer. 2006. Theory of intense matter-laser interaction.

[8] David J. Nagel. Challenges, Attractions and Possible Impacts of Commercial Generators Based on Low Energy Nuclear Reactions. *Proceedings ILENRS-'12*, Williamsburg, USA, July 1-3, 2012.

[9] ______. Potential Advantages and Impacts of LENR Generators of Thermal and Electrical Power and Energy. *Infinite Energy* Issue 103, May/June 2012

[10] Louis F. DeChiaro. 2015. Low Energy Nuclear Reactions (LENR) Phenomena and Potential Applications. *NAVSEA*. Dahlgren Division.

[11] V. Krasnoholovets, *Structure of Space and the Submicroscopic Deterministic Concept of Physics*, Apple Academic Press, Waretown (2017).

[12] V. Krasnoholovets, Yu. Zabulonov and I. Zolkin, On the nuclear coupling of proton and electron, *Universal Journal of Physics and Application* **10**, No. 3, 90-103 (2016).

[13] Rickard Lundin & Hans Lidgren. 2015. Nuclear spallation and neutron capture induced by Ponderomotive forcing. URL: https://documents.irf.se/get_document.php?group=Administration&docid=1772

[14] Rickard Lundin. 2010. On the attraction of matter by the Ponderomotive Miller force. url: https://arxiv.org/pdf/1005.4913.pdf

[15] Murat Tanisli et al. Octonic formulations of Maxwell type fluid equations. *J. Math. Phys.* 56, 091701 (2015). url: http://scitation.aip.org/content/aip/journal/jmp/56/9/10.1063/1.4930805

[16] Mario Liu. Hydrodynamic Theory of Electromagnetic Fields in Continuous Media. *Phys. Rev. Lett.* Vol. 70, No. 23 (1993). URL: http://www.uni-tuebingen.de/fileadmin/Uni_Tuebingen/Fakultaeten/MathePhysik/Institute/ITP/Dokumente/liu/phys-rev-lett-70-3580_1993.pdf

Dispelling the Myth Surrounding Maxwell's Displacement Current, and Its Applications in Triboelectric Nanogenerators for Energy Harvesting

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Abstract

In recent years, there are growing number of proposals to use a novel concept of energy harvesting using nanogenerators. This concept can be used for water wave energy harvesting, wind energy harvesting, but also for self-powered microdevices. This novel concept is based on the reality of Maxwell's displacement current. On the other hand, such a displacement current has been debated for many years: whether it is real or just a mathematical entity. This paper is intended to dispelling the myth surrounding the reality and correct interpretation of displacement current based on on Maxwell's electromagnetic theory. We also briefly discuss a plausible extension of Maxwell equations based on vortex sound theory of Prof. Tsutomu Kambe. It is our hope that discerning the myth from reality is very important step toward tapping and harvesting energy from the hidden electromagnetic structure in Nature.

Key Words: Maxwell electromagnetic theory, displacement current, piezoelectric nanogenerator, triboelectric nanogenerator, vortex sound theory.

1. Introduction

In a series of recent papers, Wang discusses possible applications of a novel concept for energy harvesting called triboelectric nanogenerators. Self-powered system is a system that can sustainably operate without an external power supply for sensing, detection, data processing and data transmission. Nanogenerators were first developed for self-powered systems based on piezoelectric effect and triboelectrification effect for converting tiny mechanical energy into electricity, which have applications in internet of things, environmental/infrastructural monitoring, medical science and security. In this paper, we present the fundamental reasoning of the nanogenerators starting from the Maxwell equations.[1]

In the Maxwell's displacement current, the first term gives the birth of electromagnetic wave, which is the foundation of wireless communication, radar and later the information technology. Our study indicates that the second term in the Maxwell's displacement current is directly related to the output electric current of the nanogenerator, meaning that our nanogenerators are the applications of Maxwell's displacement current in energy and sensors. By contrast,

electromagnetic generators are built based on Lorentz force driven flow of free electrons in a conductor.[2]
This paper is intended to dispelling the myth surrounding the reality and correct interpretation of Maxwell's original electromagnetic theory. It is our hope that discerning the myth from reality is very important step toward tapping the hidden electromagnetic structure in Nature.

2. Several different interpretations of Maxwell's displacement current

Our discussion starts from the fundamental Maxwell's equations that unify electromagnetism[2]:

$$\begin{aligned} &\nabla \cdot B = 0 (MagneticGauss), \\ &\nabla \cdot D = \rho_f (Gauss), \\ &\nabla \times E + \partial_t B = 0 (Faraday), \\ &\nabla \times H - \partial_t D = J_f (Amperecircuitallaw), \end{aligned} \tag{1}$$

Where the electric field E; the magnetic field B; magnetizing field H; the free electric charge density ρ_f; the free electric current density J_f; displacement field D,

$$D = \varepsilon_o E + P.$$

(2)

In fourth equation of (1), the second term in l.h.s. of the equation is the Maxwell's displacement current defined as

$$J_D = \partial_t D = \varepsilon_0 \frac{\partial E}{\partial t} + \frac{\partial P}{\partial t}.$$

(3)

The displacement current was first postulated by Maxwell in 1861 [1], and it was introduced on consistency consideration between Ampere's law for the magnetic field and the continuity equation for electric charges. The displacement current is not an electric current of moving free charges, but a time-varying electric field (vacuum or media), plus a contribution from the slight motion of charges bound in atoms, dielectric polarization in materials. In Eq. (3), the first component in the displacement current gives the birth of electromagnetic wave, which later being taken as the approach for developing radio, radar, TV and long distance wireless communication.
It can be shown that there is relationship between the second term in the displacement current and the output signal from nanogenerators, and show the contribution of displacement current to energy and sensors in the near future. [2]

In this paper, we briefly mention two applications of displacement current:[2]

(1) Piezoelectric nanogenerator, where the displacement current from the media polarization is:

$$J_{Di} = \frac{\partial P_i}{\partial t} = (e)_{ijk}\left(\frac{\partial s}{\partial t}\right)_{jk}.$$

(4)

(2) Triboelectric nanogenerator, where the displacement current can be expressed as:

$$J_D = \frac{\partial D_z}{\partial t} = \frac{\partial \sigma_I(z,t)}{\partial t} = \sigma_c \frac{dz}{dt}\frac{d_1\varepsilon_0/\varepsilon_1 + d_2\varepsilon_0/\varepsilon_2}{\left(d_1\varepsilon_0/\varepsilon_1 + d_2\varepsilon_0/\varepsilon_2 + z\right)^2}.$$

(5)

Nonetheless, it is known for experts in classical electromagnetic theory, that there are various opinions concerning the meaning and physical reality of equation (3). For experts, see for instance Marco Landini [4], Jackson [5], and Selvan [7]. Here we will only cite some remarks by Tombe [6], as follows:

a. *Maxwell's original approach*: Maxwell conceived the idea of displacement current in connection with elasticity. He had proposed a sea of molecular vortices to explain electromagnetic phenomena, and those vortices were surrounded by electric particles that acted as idle wheels. His views on displacement current can be read in the introduction to part III of his 1861 paper 'On Physical Lines of Force' (beginning at page 39 in the pdf file) at [1]. Maxwell was never satisfied that his molecular vortex model represented a totally accurate picture, and so his attempt to explain the detailed physical significance of displacement current in relation to the rotational aspect of his molecular vortices was somewhat vague. He seemed to be saying that the force involved in displacement current is a tangential force which alters the state of angular momentum of the vortices, and that electromagnetic radiation is therefore a propagation of fine-grained angular acceleration. The angular momentum H would therefore be at right angles and in phase with the tangential force E. Maxwell added displacement current to Ampère's Circuital Law in order to make it applicable to 'Total Current', but it is clear that he did not intend the applicability of this modified version of Ampère's Circuital Law to be restricted to the vicinity of electric current circuits. His follow up work indicates that he intended it to apply anywhere where electromagnetic radiation exists. There seems to be a popular idea circulating around that Maxwell conceived of displacement current in conjunction with the electric capacitor circuit, but this idea is not found in his original papers. [6]

b. *The Modern Textbook Approach:* The modern textbook approach to displacement current is quite different to Maxwell's approach. It is based on the idea that Ampère's Circuital Law needs to be modified in order to comply with situations, such as that which arises in the capacitor circuit, in which charge density is varying with time. Displacement current is then added to one side of Ampère's Circuital Law as an additional term, but it is added on the basis that it is not a real current. The fact that modern displacement is not a real current means that the Ampère's Circuital Law equation has been unbalanced by virtue of adding a new term to one side only. This approach however creates two problems. First of all, the justification for unbalancing the equation is based on the philosophy that the end justifies the means. That is a highly dubious approach when it comes to interfering with equations that have already been derived in the state that they are in. A closer look at the situation further shows that the additional term does not address the issue which it is said to be addressing.[6]

c. *The Polarization approach:* A current flows in a capacitor circuit. This in turn causes a linear polarization of the dielectric between the capacitor plates which blocks the current flow. Linear polarization is a self restoring elastic effect and it is roughly what Maxwell had in mind for displacement current. Maxwell considered displacement current to differ from free current in that the elasticity of the medium would cause the displacement current to grind to a halt. However, as regards electromagnetic radiation, the displacement in question would have to be an angular displacement as opposed to a linear displacement. And in that regard it is interesting to note that Maxwell's concept of polarization was not the straightforward linear effect that we have in mind. In part III of Maxwell's 1861 paper, he says "I conceived the rotating matter to be the substance of certain cells, divided from each other by cell-walls composed of particles which are very small compared with the cells, and that it is by the motions of these particles, and their tangential action on the substance in the cells, that the rotation is communicated from one cell to another." [1]

To conclude this matter, again allow us to cite Tombe [6]:

> "The modern day displacement current is a highly dubious virtual concept, and it bears no connection to what Maxwell had in mind. Conservation of charge in a capacitor circuit is not an issue which is in anyway addressed by displacement current. Conservation of charge is a hydrodynamical issue that is catered for by Bernoulli's Principle whereby voltage and charge represent pressure and current represents velocity. Charge variation with time is not a matter which is catered for in any respect within the realm of Ampère's Circuital Law. If we wish to add a displacement current term to Ampère's Circuital Law then we must justify it in terms of real current just as Maxwell did."

It appears to us that the only way to figure out the reality of Maxwell's displacement current is either to measure it with capacitor [8], or use it for nanogenerators [2]. In other words, it seems possible that future nanogenerators will expose the hidden reality behind displacement current, or may be a new term needs to be added.

3. A plausible extension of Maxwell's displacement current

There are a number of proposals to revise Maxwell equations. But few has considered a fresh starting point with regards to the structure of aether. It is very interesting to note that Prof. T. Kambe from University of Tokyo has made a connection between the equation of vortex sound and fluid Maxwell equations. He wrote that it would be no exaggeration to say that any vortex motion excites *acoustic* waves. [3]

He considers the equation of vortex sound of the form: [3]

$$\frac{1}{c^2}\partial_t^2 p - \nabla^2 p = \rho_0 \nabla . L = \rho_0 div(\omega \times v) \tag{8}$$

He also wrote that dipolar emission by the vortex-body interaction is:[3]

$$p_F(x,t) = -\frac{P_0}{4\pi c}\dot{\Pi}_i(t - \frac{x}{c})\frac{x_c}{x^2} \tag{9}$$

Then he obtained an expression of fluid Maxwell equations as follows [3]:

$$\begin{aligned} &\nabla \cdot H = 0 \\ &\nabla \cdot E = q \\ &\nabla \times E + \partial_t H = 0 \\ &a_0^2 \nabla \times H - \partial_t E = J \end{aligned} \tag{10}$$

Where [4]:

a_0 denotes the sound speed, and

$$\begin{aligned} &q = -\partial_t(\nabla \cdot \upsilon) - \nabla \hbar, \\ &J = \partial_t^2 v + \nabla \partial_t h + a_o^2 \nabla \times (\nabla \times \upsilon) \end{aligned} \tag{11}$$

In our opinion, this new expression of fluid Maxwell equations suggests that there is a deep connection between vortex sound and electromagnetic fields. Therefore, it may offer new ways to *alter* the form of electronuclear potential as described in the previous section.

However, it should be noted that the above expressions based on fluid dynamics need to be verified with experiments. We should note also that in (10) and (11), the speed of sound a_0 is analogous of the speed of light in Maxwell equations, whereas in equation (8), the speed of sound is designated "c" (as analogous to the light speed in EM wave equation).

It is our hope that such a new interpretation and modification of Maxwell equations based on vortex sound will lead to further development in nanogenerators technology.

As an added note, we can mention here that elsewhere Wang [9] was able to derive Coulomb law from the source-sink approach. We are wondering if it is also possible to rederive Maxwell equations including displacement current from the same approach. If yes, then it may offer another fresh starting point to understand the physical meaning of displacement current.

4. Concluding remarks

In recent years, there are growing number of proposals to use a novel concept of energy harvesting using nanogenerators. This concept can be used for water wave energy harvesting, wind energy harvesting, but also for self-powered microdevices. This novel concept is based on the reality of Maxwell's displacement current. On the other hand, such a displacement current has been debated for many years: whether it is real or just a mathematical entity. This paper is intended to dispelling the myth surrounding the reality and correct interpretation of displacement current based on on Maxwell's electromagnetic theory. We also briefly discuss a plausible extension of Maxwell equations based on vortex sound theory of Prof. Tsutomu Kambe. It is our hope that discerning the myth from reality is very important step toward tapping and harvesting energy from the hidden electromagnetic structure in Nature.

Acknowledgment: The first author (VC) also would like to express his gratitude to Jesus Christ who always encouraged and empowered him in many occasions. He is the Good Shepherd. *Soli Deo Gloria!*

References

[1] James C. Maxwell. *On Physical Lines of Force*. 1861. http://vacuum-physics.com/Maxwell/maxwell_oplf.pdf

[2] Zhong Lin Wang. On Maxwell's displacement current for energy and sensors: the origin of nanogenerators. *Materials Today*, Volume 00, Number 00, January 2017. http://dx.doi.org/10.1016/j.mattod.2016.12.001

[3] Victor Christianto, Yunita Umniyati, Volodymyr Krasnoholovets. On Plausible Role of Classical Electromagnetic Theory and Submicroscopic Physics to understand and enhance Low Energy Nuclear Reaction (LENR): A Preliminary Review. *J. Cond. Matt. Nucl. Sci.,* April 2017. http://www.iscmns.org

[4] Marco Landini. About the Physical Reality of "Maxwell's Displacement Current" in Classical Electrodynamics. *Progress In Electromagnetics Research*, Vol. 144, 329-343, 2014

[5] J.D. Jackson. Maxwell's displacement current revisited. *Eur. J. Phys.* 20 (1999) 495–499. PII: S0143-0807(99)06956-1

[6] Frederick David Tombe. *Displacement Current*. http://www.wbabin.net/science/displacement.pdf

[7] Krishnasamy T. Selvan. A revisiting of scientific and philosophical perspectives on Maxwell's displacement current. *IEEE Antennas and Propagation Magazine*, Vol. 51, No.3, June 2009

[8] D.F. Bartlett & T.R. Corle. Measuring Maxwell's Displacement Current inside a Capacitor. *Physical Review Letters* vol. 55 no. 1, 1985.

[9] Xiao-Song Wang. Derivation of Coulomb's Law of Forces Between Static Electric Charges Based on Spherical Source and Sink Model of Particles. arXiv: physics/0609099v2 [physics.gen-ph]

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VC & FS

It's *Déjà Vu* All Over Again: A Classical Interpretation of Syntropy and Precognitive Interdiction Based on Wheeler-Feynman's Absorber Theory

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ABSTRACT

It has been known for long time that intuition plays significant role in many professions and human life, including in entrepreneurship, government, and also in detective or law enforcement activities. Even women are known to possess better intuitive feelings or "hunch" compared to men. Despite these examples, such a precognitive interdiction is hardly accepted in established science. In this paper, we discuss briefly the advanced solutions of Maxwell equations, and then make connection between syntropy and precognition from classical perspective. It is our hope that the new proposed method can be verified with experimental data. But we admit that our model is still in its infancy, more researches are needed to fill all the missing details.

Keywords: intuition, syntropy, precognition, Maxwell equation, advanced wave solution.

1. Introduction

It has been known for long time that intuition plays significant role in many professions and other aspects of human life, including in entrepreneurship, government, and also in detective or law enforcement activities. Even women are known to possess better intuitive feelings or "*hunch*" compared to men.[1] Despite these examples, such a precognitive interdiction is hardly accepted in established science.

In this paper, we discuss briefly the advanced solutions of Maxwell equations in the context of Wheeler-Feynman-Cramer's absorber theory, and then make connection between syntropy and precognition from classical perspective. This may be regarded as first step to describe such precognition activities which are usually considered belong to quantum realm.

It is our hope that the new proposed method can be verified with experimental data. Nonetheless, we admit that our model is still in its infancy, more researches are needed to fill all the missing details.

2. John Cramer's take on Wheeler-Feynman's absorber theory

The Wheeler-Feynman's paper on absorber theory has been discussed and generalized by John Cramer. He discussed among other things on the physical interpretation of advanced and retarded solutions of Maxwell equations and also Klein-Gordon equation.

Our discussion starts from the fundamental Maxwell's equations that unify electromagnetism[1]:

$$\begin{aligned}
&\nabla \cdot B = 0 (MagneticGauss), \\
&\nabla \cdot D = \rho_f (Gauss), \\
&\nabla \times E + \partial_t B = 0 (Faraday), \\
&\nabla \times H - \partial_t D = J_f (Amperecircuitallaw),
\end{aligned} \tag{1}$$

It is known that electromagnetic wave equation corresponding to (1) admits advanced wave solution.

[1] This paper is inspired in part by our discussion few months ago with Carmen Wrede from Gerrmany. She told that she got a *hunch* or a feeling to experience electromagnetic wave from certain future events.

Of course, here we do not have to accept all transactional QM interpretation by Cramer[1][2], but we can keep our discussion straightly within the scope of classical electromagnetic theory.

The electromagnetic wave equation for source-free space can be written in the form:

$$c^2\nabla^2\vec{F} = \frac{d^2\vec{F}}{dt^2}, \tag{2}$$

where c represents the speed of light, and F represents either the electric field vector E or the magnetic field vector B of the wave.[1]

Since this differential equation is second order in both time and space, it has two independent time solutions and two independent space solutions. Let us restrict our consideration to one dimension by requiring that the wave motion described by equation (2) moves along with x axis and that the E vector of the wave is along the y axis.

Then two independent time solutions of equation (2) might have the form [1]:

$$\vec{E}_{\pm}(x,t) = \hat{y}E_0 \sin\left[2\pi\left(\frac{x}{\lambda} \pm ft\right)\right], \tag{3}$$

and

$$\vec{B}_{\pm}(x,t) = \hat{y}B_0 \sin\left[2\pi\left(\frac{x}{\lambda} \pm ft\right)\right], \tag{4}$$

Quoting from Cramer's notes on the solutions of equations (3) and (4):[1]

> Thus, wave $E_+(x,t)$ is a *negative-energy* (and negative-frequency) solution of Eq. (1). As mentioned above, it will arive at a point a distance x from the source at a time $t=x/c$.*before* the instant of emission. For this reason, it is called an *advanced* wave. Solution $E_-(x,t)$, on the other hand, is the more familiar positive-energy solution of Eq. (1). It arrives at x a time $t=x/c$ after the instant of emission and is called the *retarded* solution.

It should be clear, therefore, that advanced wave solution is inherent in the classical electromagnetic wave equations, without having to resort to Cramer's transactional interpretation of QM.

Next, we are going to discuss physical interpretation of such an advanced wave solution.

3. Interpretation of Advanced Wave Solution: Syntropy and Precognition

The above analysis by Cramer which seems to suggest that EPR paradox just disappears when considering the advanced waves to be real physical entities, has been suggested by other physicists too, notably: Costa de Beauregard and also Luigi Fantappie. While working on quantum mechanics and special relativity equations, Luigi noted that that retarded waves (retarded potentials) are governed by the law of entropy, while the advanced waves are governed by a symmetrical law that he named "*syntropy*."[3]

Therefore, some psychologists who work in this area began to make connection between the notion of syntropy and precognitive interdiction. And recently, a new journal by title *Syntropy* has been started to facilitate such a discussion.

But again let us emphasize here that equation (3) and (4) indicate that the advanced wave solutions have purely classical origin. Therefore, we do not discuss yet their connection with other alleged QM phenomena such as collapsing wave function which is hardly possible to prove experimentally, despite Bohr and Heisenberg insisted such a phenomenon is real. This is our departure to QM's inspired syntropy discussions in [3]-[6].

Our knowledge in this area is very limited, but we can expect that research in this direction of precognitive interdiction will flourish in the near future, once we can accept that it is purely classical origin, so we do not have to invoke complicated QM arguments.

As a last remark for experimenters, it may be advisable to verify this syntropy effect in women, especially those who are already proved as good '*precogniters*."

4. Concluding Remarks

It has been known for long time that intuition plays significant role in many professions and various aspects of human life, including in entrepreneurship, government, and also in detective or law enforcement activities. Even women are known to possess better intuitive feelings or "hunch" compared to men.

Despite these examples, such a precognitive interdiction (hunch) is hardly accepted in established science. In this paper, we discuss briefly the advanced solutions of Maxwell equations, and then make connection between syntropy and precognition from classical perspective. This may be regarded as first step to describe such precognition activities which are usually considered belong to quantum realm.

But we admit that our model is still in its infancy, more researches are needed to fill all the missing details. Further observations and experiments are recommended to verify the above propositions.

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References:

[1] John G. Cramer. Generalized Absorber Theory and the Einstein-Podolsky-Rosen paradox. *Phys. Rev. D*, Vol. 22 no. 2 (1980)

[2] John G. Cramer. The transactional interpretation of Quantum Mechanics and Quantum Nonlocality. arXiv: 1503.00039 (2015)

[3] Antonella Vannini. Url: http://www.hessdalen.org/sse/program/Antonella.pdf

[4] Antonella Vannini & Ulisse Di Corpo. *J. of Cosmology*. Url: http://www.alice.id.tue.nl/references/vannini-di_corpo-2011.pdf

[5] Ulisse Di Corpo and Antonella Vannini. *Syntropy* 2010. Url: http://www.lifeenergyscience.it/english/2010-eng-1-2.pdf

[6] Ulisse Di Corpo and Antonella Vannini. *Syntropy* 2010. Url: http://www.lifeenergyscience.it/english/2010-eng-1-4.pdf

[7] Ty E. Narada. Precognitive interdiction. Url: http://www.cyonic-nemeton.com/investigations.html

How many points are there in a line segment? – A new answer from discrete space viewpoint

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ABSTRACT

While it is known that Euclid's five axioms include a proposition that a line consists at least of two points, modern geometry avoid consistently any discussion on the precise definition of point, line, etc. It is our aim to clarify one of notorious question in Euclidean geometry: how many points are there in a line segment? – from discrete space viewpoint. In retrospect, it may offer an alternative of quantum gravity, i.e. by exploring discrete gravitational theories.

1. Introduction

So many students from all ages have asked this question: how many points are there in a line segment? And a good math teacher will answer politely: in the circumference of a circle there are infinite number of points[1]. Similarly one can also ask: how many lines are there in a rectangular? The answer again is known: there are infinite number of lines in given rectangular.

But a careful student will ask again: but what is the definition of point and line? Teacher will answer again: a point is a circle with zero diameter, and line is composed of infinite points.

If our beloved student persists, he/she will continue to ask: but teacher, if a circle has zero diameter, then an infinite number of zeroes will not make a finite line, isn't it?

At this time, there is fair chance that the teacher feel upset and say: “shut up and calculate.”

That is what usually happens in most primary school mathematics classroom, and the situation is not getting better in undergraduate classroom. Only in graduate math class, then the students are allowed to ask numerous questions, such as foundations of mathematics etc.

Here we will offer a simpler solution of the above posed question from a discrete space viewpoint, with very wide implications, including distinction between quantization and discretization.

2. Solution: the space consists of circles with finite diameter

The obvious paradox that we set in the introduction section can be simplified as follows:

$$0+0+0+\ldots\text{ad infinitum} = 0$$

Therefore the basic postulate that a line segment consists of circles with zero diameter is contradictory by itself.

Our proposed solution is to assume that the space consists of circles with small but finite diameter (z), therefore if a line segment consists of circles like that, we have:

$$z+z+z+\ldots\text{ad infinitum} = \text{finite line}$$

One implication of this proposition is that we should better consider the geometry of space not as continuum, but as a discrete space. And we must remember that discretization of space is much more fundamental than quantization.

Moreover, we can consider the following:

a. It can be shown that similar indeterminacy problem plagues the very definition of differential calculus, as no one knows that actual size of dx. See H.J.M. Bos [2]:

> **2.15.** *I turn now to a difficulty which necessarily arises in any attempt to set up an infinitesimal calculus which takes the differential as fundamental concept, namely the indeterminacy of differentials.*
>
> *The first differential dx of the variable x is infinitely small with respect to x, and it has the same dimension as x. These are the only conditions it has to satisfy, and they do not determine a unique dx, for if dx satisfies the conditions then clearly so do $2dx$ and $\frac{1}{2}dx$ and in general all $a\,dx$ for finite numbers a. That is, all quantities that have the same dimension and the same order of infinity as dx might serve as dx.*
>
> *Moreover, there are elements not from this class which satisfy the conditions for dx; for instance dx^2/a and $\sqrt{a\,dx}$, for finite positive a of the same dimension as x. dx^2/a is infinitely small with respect to dx and $\sqrt{a\,dx}$ is infinitely large with respect to dx, so that there is even not a privileged class of infinite smallness from which dx has to be chosen; there is no "first" class of infinite smallness adjacent to finiteness. Thus first-order differentials involve a fundamental indeterminacy.*

b. Boyer has shown that Planck blackbody radiation can be derived from discrete charge assumption (without partition as assumed by Planck). See [3].

c. Lee Smolin has described three approaches to quantum gravity in his book[4]. But considering our proposition above, it seems that the notion of quantum gravity may be not necessary. Instead, we should consider discrete gravity theories.

d. Gary W. Gibbons and George F.R. Ellis have considered a discrete Newtonian cosmology. That is a good start [5].

e. Gerard 't Hooft has proposed a discrete deterministic interpretation of QM.[6] But it seems the use of both discrete and quantum language are superfluous. We need to let go the quantum terminology with its own excess baggage.

f. At astronomical scale, Conrad Ranzan has proposed a cellular universe, which is essectially a Newtonian Steady-State model but with a discrete cellular space model.[7] In our view, such an approach needs to be explored and investigated further. See also our recent paper, where we suggest an ultradiscrete KdV as model of cosmology [8]. See also Lindquist-Wheeler model [9][10].

3. Concluding Remarks

An old question and paradox in Euclidean geometry may be resolved consistently, once we accept and assume a discrete space instead of continuum model which is full of indeterminacies.

Many implications and further developments can be expected both in particle physics realm and also in cosmology theorizing. More observation and experiments are recommended to verify whether the space is discrete or continuous.

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References:

[1] https://math.stackexchange.com/questions/1799125/how-many-points-in-a-line-segment

[2] H.J.M. Bos. Differentials, Higher Order Differentials, and the Derivative in the Leibnizian calculus. *Arch. Hist. Exact. Sci.* vol. 14, p. 24

[3] Timothy H. Boyer. Connecting blackbody radiation, relativity, and discrete charge in classical electrodynamics. arXiv: physics/0605003 (2006)

[4] Lee Smolin. *Three roads to quantum gravity*. Basic Books, 2001.

[5] Gary Gibbons and George Ellis . Discrete Newtonian Cosmology. *Classical and Quantum Gravity* vol. 31, no. 2, (2013), see also arXiv: 1308.1852 (2013). url: http://iopscience.iop.org/article/10.1088/0264-9381/31/2/025003/meta

[6] Gerard ‘t Hooft. A Deterministic Interpretation of Quantum Mechanics. url: www.rug.nl/research/vsi/events/groenewold/thooft.pdf

[7] Conrad Ranzan. Large scale structure of the Dynamic Steady State Universe. *American Journal of Astronomy and Astrophysics* 2016, 4(6): 65-77. http://www.sciencepublishinggroup.com. See also www.cellularuniverse.org

[8] Victor Christianto & Florentin Smarandache & Yunita Umniyati. An outline of Cellular Automaton Universe via Cosmological KdV equation. Published at *Prespacetime Journal*, and this paper was also presented at CTPNP 3rd, 1st Aug 2017, held in Bandung, Indonesia.

[9] Mohamad Shalaby. Dynamics and Light Propagation in a Universe with Discrete-Matter Content. arXiv: 1205.68773 [gr-qc]

[10] Rex G. Liu. The Lindquist-Wheeler formulation of lattice universes. arXiv: 1501.05169 [gr-qc]

Towards Soliton Computer Based on Solitary Wave Solution of Maxwell-Dirac equation: A Plausible Alternative to Manakov System

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ABSTRACT

In recent years, there are a number of proposals to consider collision-based soliton computer based on certain chemical reactions, namely *Belousov-Zhabotinsky* reaction, which leads to soliton solutions of coupled Nonlinear Schroedinger equations. They are called Manakov System. But it seems to us that such a soliton computer model can also be based on solitary wave solution of Maxwell-Dirac equation, which reduces to Choquard equation. And soliton solution of Choquard equation has been investigated by many researchers, therefore it seems more profound from physics perspective. However, we consider both schemes of soliton computer are equally possible. More researches are needed to verify our proposition.

1. Introduction: early development of soliton science

There is little doubt that soliton technology has recently achieved close to pop science status as its proponents seek to put it to use for transporting vast amounts of information—the stuff that gives our era its name—farther and faster. It could well become one of the fundamental technologies in the current communications revolution. It was during the Industrial Revolution, however, that this phenomenon was first noticed and studied.[1]

A Scottish engineer by the name of John Scott Russell had set out to create a more efficient hull design for canal boats (a 19th-century forerunner, perhaps, of current efforts to speed packets of information along fiber-optic cables). One day in August of 1834, he stood beside Union Canal near Edinburgh to observe the movement of a boat being pulled by two horses. As the rope pulling the boat snapped and the boat's movement halted, its prow dropped back down and Scott Russell saw a large mass of water, a smooth, solitary wave, gather around the prow and continue rapidly down the channel. Surprised and intrigued, he followed on horseback and noticed that the wave held its shape and only very gradually diminished in height. He lost sight of it after a mile or two but was so taken with this observation that he built a 30-foot wave tank in his back yard to study the phenomenon further. Ten years later, he reported his observations to the British Association for the Advancement of Science, calling what he had observed the "wave of translation." Scott Russell considered that day back in 1834 "the happiest day of my life", but his discovery was ignored by all but one or two people, who felt compelled to prove him wrong in the scientific literature. After all, it was common knowledge that waves could not behave in this way.[1]

Vindication came from two independent camps, both of which were attempting to explain the movement of shallow water waves. Boussinesq's equation in 1872 and the Korteweg–de Vries (KdV) equation in 1895 proved that solitary waves were, indeed, theoretically possible. Many theoretical and experimental developments have been done since then.

By the early 1980s, however, fiber-optic technology had caught up somewhat, and Linn Mollenauer, Roger Stolen, and Jim Gordon were able to observe soliton propagation in the lab. As mathematical results continued to appear, this group at Bell Labs was experimenting intensively with optical solitons, looking for ways to use them in long-

distance telecommunication systems. Ironically, while their work was enthusiastically received in scientific circles, it seemed that the practical application could not be quickly realized, and they were told by the head of research, Arno Penzias, to desist.
Doggedly, they persisted until their results were so compelling that Penzias apologized and publicly praised the work. Mollenauer's group has since achieved several long-distance and speed records for optical soliton transmission.[1]

2. Recent development: soliton computer possibility

It is a known fact in computer industry, that the present silicon technology cannot keep up with the Moore's law. Therefore new ways of developing unconventional computing methods are being carried out in many labs.

Since 2005, some researchers from Princeton University have reported a new concept of soliton computing. As data rates in optical communication systems continue to increase, the demand for all-optical signal processing and computing devices does as well. Examples of such devices include the nonlinear optical loop mirror, the temporal soliton dragging gate, the spatial soliton deflection gate, and the TOAD, an asymmetric loop mirror. These devices avoid the bottleneck associated with optical-electrical conversion.[2] They describe physical state-restoring computation using collisions of optical solitons. Their work is part of a larger subject known as collision-based computing, sometimes called dynamical computation. Such constructions include ideal collisions of billiard balls, Conway's universal game of Life, and multidimensional excitable lattices. Early work on soliton computation involved soliton-like collisions in cellular automata, which demonstrated the ability to embed computation in automata using particles. [2]

In their initial study, Rand et al, consider a Manakov system, which is essentially a system of coupled NLSE, where q1 (x, t) and q2 (x, t) are two interacting optical components, μ is a positive parameter representing the strength of the nonlinearity, and x and t are normalized space and time, respectively. The two components can be thought of as components in two polarizations, or, as in the case of a photorefractive crystal, two uncorrelated beams.[2]

The Manakov system consists of two coupled NLSEs [18]:

$$i\frac{\partial q_1}{\partial t}+\frac{\partial^2 q_1}{\partial x^2}+2\mu(|q_1|^2+|q_2|^2)q_1=0$$
$$i\frac{\partial q_2}{\partial t}+\frac{\partial^2 q_2}{\partial x^2}+2\mu(|q_1|^2+|q_2|^2)q_2=0$$

Source: Rand et al.[2]

From a practical standpoint, successful soliton computation requires ideal interactions and error-free propagation. In this sense, it is analogous to the construction of Fredkin and Toffoli, in which ideal, elastic collisions of billiard balls were used to achieve universal and reversible computation. In reality, noise will cause variability in soliton propagation and collision, and fault tolerance based on logical state restoration would need to be implemented in order to improve system performance. In a sense, this is an analog rather than a digital computer. Rand et al. also reported more advanced work based on bistable configurations of Manakov solitons. [2]

More recent discussions of collision-based soliton computing still use that basic Manakov system. See [3][4].

In the next section we will discuss an alternative approach for soliton computer.

3. A plausible alternative: Soliton computer based on Choquard equation

In a recent paper, we discuss how Dirac-Maxwell equation reduces to wave equation, which can be transformed into a cellular-automaton scheme.[5]

Now, it is worthy to remark here that a recent paper shows that there is travelling wave solution of (classical) Dirac-Maxwell equation.[6]

It should be noted that numerical results showed that Dirac-Maxwell system has definitely many families of solitary waves. Here the nonnegative integer N denotes the number of nodes of the positronic component of the solution (number of zeros of the corresponding spherically symmetric solution to the Choquard equation).

It can be shown that the nonrelativistic limit of such a solitary wave solution takes the form of Choquard equation, which can be written as follows:[6]

$$\omega\phi = -\frac{1}{2m}\Delta\phi + q^2\Delta^{-1}\left(|\phi|^2\right)\phi. \qquad (1)$$

Considering that the above Choquard equations is similar to the NLSE (nonlinear Schrodinger equation), and also that Manakov system is a system of coupled NLSE, then we consider it plausible to consider a Manakov-Choquard system as follows:

$$\omega\phi_1 = -\frac{1}{2m}\Delta\phi_2 + q^2\Delta^{-1}\left(|\phi_2|^2\right)\phi_1. \qquad (2)$$

$$\omega\phi_2 = -\frac{1}{2m}\Delta\phi_1 + q^2\Delta^{-1}\left(|\phi_1|^2\right)\phi_2. \qquad (3)$$

The solutions of (2) and (3) can be explored numerically with computer algebra system such as Mathematica.

As far as we know, such a Manakov-Choquard system has not been proposed before for studying soliton computer.

4. Concluding Remarks

Considering the everincreasing demand for better computers, some researchers have considered collision-based soliton computer. And this proposal is based on Manakov system. In this paper, we consider a new concept based on travelling wave solutions of Dirac-Maxwell equations, which we call Manakov-Choquard system.

As far as we know, such a Manakov-Choquard system has not been proposed before for studying soliton computer.

More observation and experiments are recommended to verify our propositions.

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References:

[1] Bonnie and Bill Kath. Making Waves: solitons and their optical applications. From *SIAM News*, Vol. 31 No. 2

[2] Darren Rand, Ken Steiglitz and Paul R. Prucnal. Signal Standardization in Collision-based Soliton Computing. *Int. J. Unconventional Computing*, Vol.1, pp. 31-45 (2005)

[3] Darren Rand, Ken Steiglitz. Computing with solitons. July 2007

[4] M. Jakubowsky, Ken Steiglitz, Richard Squier. Computing with Classical Soliton Collisions. January 2015.

[5] Victor Christianto & Florentin Smarandache. A Cellular Automaton Molecular Model based on Wave Equation: An Alternative to Cellular Automata QM. 2017. Submitted for *Special Issue of MDPI-Mathematics journal: Beyond Quantum Physics, and Computation*. url: www.mdpi.com

[6] Andrew Comech & David Stuart. Small amplitude solitary waves in the Dirac-Maxwell system. arXiv: 1210.7261v3 (2012)

[7] Vitaly Moroz & Jean Van Schaftingen. A guide to the Choquard equation. arXiv: 1606.02518 [math.AP]

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He was born in East Java, Indonesia, and he grew up there and enrolled in Brawijaya State University. Then he worked as an engineer from 1993-2000. In 2000 he changed his career to database and webdevelopment until November 2008. In December 2008 he was granted a scholarship to study gravitation and cosmology at the Institute of Gravitation and Cosmology of the Peoples' Friendship University of Russia (RUDN) in Moscow. But he did not complete the study because of some reasons.

He returned to Indonesia from Moscow at May 30, 2009, and worked again until October 2009. In October 2009, in a prayer Jesus Christ asked him: "Victor Christianto, do you love Me?" three times, just like in Gospel of John 21:15-17. So he repented and renewed his faith in Jesus Christ, and then he works only for Jesus Christ until now as an independent researcher. He has completed a master degree in theology (MTh) in September 2014 from Satyabhakti Advanced School of Theology (www.sttsati.org). He works now as a bible editor since April 2015. And since August 2015, he holds Doctor of Divinity and also he begins administering www.Sci4God.com. It is a new social networking site dedicated for dialogue between math, science, and theology. Visit and join with us at http://www.Sci4God.com.

He loves science as well as theology topics. His particular interests are gravitation, electromagnetic, mathematics and cosmology. He has published more than 17 books either independently or together with Prof. Florentin Smarandache and other scientists, including:

(1) Victor Christianto. Manajemen Proyek berbasis Internet.

(2) Victor Christianto. Oracle JSP: Sebuah Pengantar.

(3) Multi-Valued Logic, Neutrosophy, and Schrodinger Equation (2006).

(4) Unfolding the Labyrinth: Open Problems in Physics, Mathematics, Astrophysics and other Areas of Science (2007).

(5) Quantization in Astrophysics, Brownian Motion and Supersymmetry (2007).

(6) Hadron Models and related New Energy issues (2008).

(7) Cultural Advantage for Cities: An alternative for developing countries (2008).

(8) Cultural Advantages in China / Tale of Six Cities (2009).

(9) Neutrosophic Logic, Wave Mechanics, and Other Stories (Selected Works 2005-2008) (2009).

(10) Quantization and Discretization at Large Scales (2012).

(11) Some Problems of Nuclear Energy Development in Asia (2013),

(12) Clan Capitalism, Graph Distance, and Other Issues (2013), URL: http://www.gallup.unm.edu/~smarandache/ClanCapitalism.pdf

(13) Florentin Smarandache , Victor Christianto. A Journey into Quantization in Astrophysics (2013).

(14) Victor Christianto. Grace for you: 44 Guides for Living inspired by Jesus Christ. Saarbrucken, Germany: Blessed Hope Publishing, 2013.
URL: https://www.morebooks.de/store/gb/book/grace-for-you/isbn/978-3-639-50070-7

(15) Victor Christianto. A.L.I.C.E. with Jesus: A Life-Changing Experience with Jesus. Saarbrucken, Germany: Blessed Hope Publishing, 2014.
Available at URL: https://www.morebooks.de/store/gb/book/a-l-i-c-e-with-jesus/isbn/978-3-639-50080-6

(16) Victor Christianto. Drink the New Wine: Experience God in your daily life. Saarbrucken, Germany: Blessed Hope Publishing, 2014. Available at www.morebooks.de

(17) Victor Christianto. Seeking a Theory for the End of the World: Introduction to Fractal Vibrating String. Saarbrucken, Germany: LAP-Lambert Academic Publishing, 2014.

He also has published 8 books (in Kindle digital format) under guidance of Jesus Christ, as follows:

(1) Articles dictated by Jesus Christ. Book One. URL: http://www.amazon.com/dp/B00AYR6TJU

(2) Articles dictated by Jesus Christ. Book Two. URL: http://www.amazon.com/dp/B00AYR3F9C

(3) by Jesus Christ: How social darwinism ruin America and the World. URL: http://www.amazon.com/dp/B00AZDJJQI

(4) by Jesus Christ: Evangelism for Difficult People. URL: http://www.amazon.com/dp/B00AZDJCLA

(5) by Jesus Christ: How you can do Evangelism with Social Media. URL: http://www.amazon.com/dp/B00AZDXZLI

(6) by Jesus Christ: The Nicene Creed. URL: http://www.amazon.com/dp/B00AZDYMJ2

(7) by Jesus Christ: Logos, Memra, and other letter for Economists. URL: http://www.amazon.com/dp/B00AZDY7JW

(8) by Jesus Christ: our Father in Heaven prayer. URL: http://www.amazon.com/dp/B00AZKZUNM

He also published more than 45 scientific papers, some of them are available in vixra.org. You can send email to him at victorchristianto@gmail.com or vic104@hotmail.com. Supervisors: Prof. Vladimir V. Kassandrov, Dr. Paskalis Edwin Nyoman Paska, Drs. Gani Wiyono, Th.M, and Prof. Florentin Smarandache

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**Founder of Second Coming Institute, www.sci4God.com

Http://www.facebook.com/vchristianto

Twitter: @Christianto2013, Line: @ThirdElijah, IG: @ThirdElijah

***books: http://nulisbuku.com/books/view_book/9035/sangkakala-sudah-ditiup

http://nulisbuku.com/books/view_book/9694/sastra-harjendra-ajaran-luhur-dari-tuhan-

a5

http://www.unesco.chair.network.uevora.pt/media/kunena/attachments/731/ChristologyReloaded_Aug2016.pdf

http://fs.gallup.unm.edu/APS-Abstracts/APS-Abstracts-list.htm

http://independent.academia.edu/VChristianto

Http://researchgate.net/profile/Victor_Christianto/

http://www.amazon.com/Victor-Christianto/e/B00AZEDP4E

http://nulisbuku.com/books/view_book/9661/teologi-yesus-sobat-kita-10-artikel-dialog-antara-teologi-dan-sains

http://nulisbuku.com/books/view_book/9693/jalan-yang-lurus-manual-anak-anak-terang-a5

http://www.mdpi.com/journal/mathematics/special_issues/Beyond_Quantum_Physics_Computation

A Short Biography of the Authors: Florentin Smarandache[4]

polymath, professor of mathematics

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E-mail: fsmarandache@gmail.com

Personal web page: http://fs.gallup.unm.edu/

Scientist, writer, and artist. Wrote in four languages: English, Romanian, French, and Spanish.

He did post-doctoral researches at Okayama University of Science (Japan) between 12 December 2013 - 12 January 2014; at Guangdong University of Technology (Guangzhou, China), 19 May - 14 August 2012; at ENSIETA (National Superior School of Engineers and Study of Armament), Brest, France, 15 May - 22 July 2010; and for two months, June-July 2009, at Air Force Research Laboratory in Rome, NY, USA (under State University of New York Institute of Technology).

Graduated from the Department of Mathematics and Computer Science at the University of Craiova in 1979 first of his class graduates, earned a Ph. D. in Mathematics from the State University Moldova at Kishinev in 1997, and continued postdoctoral studies at various American Universities such as University of Texas at Austin, University of Phoenix, etc. after emigration.

In U.S. he worked as a software engineer for Honeywell (1990-1995), adjunct professor for Pima Community College (1995-1997), in 1997 Assistant Professor at the University of New Mexico, Gallup Campus, promoted to Associate Professor of Mathematics in 2003, and to Full Professor in 2008.
Between 2007-2009 he was the Chair of Math & Sciences Department.

In mathematics he introduced the degree of negation of an axiom or theorem in geometry (see the Smarandache geometries which can be partially Euclidean and partially non-Euclidean, 1969, http://fs.gallup.unm.edu/Geometries.htm), the multi-structure (see the Smarandache n-structures, where a weak structure contains an island of a stronger structure, http://fs.gallup.unm.edu/Algebra.htm), and multi-space (a combination of heterogeneous spaces) [http://fs.gallup.unm.edu/Multispace.htm].
He created and studied in number theory many:
sequences (
http://mathworld.wolfram.com/SmarandacheSequences.html, http://mathworld.wolfram

[4] http://www.gallup.unm.edu/~smarandache/FlorentinSmarandache.htm

.com/ConsecutiveNumberSequences.html),
functions (http://mathworld.wolfram.com/SmarandacheFunction.html,
http://mathworld.wolfram.com/SmarandacheCeilFunction.html,
http://mathworld.wolfram.com/Smarandache-KurepaFunction.html,
http://mathworld.wolfram.com/Smarandache-WagstaffFunction.html,
http://mathworld.wolfram.com/SmarandacheNear-to-PrimorialFunction.html,
http://mathworld.wolfram.com/PseudosmarandacheFunction.html),
numbers (http://mathworld.wolfram.com/SmarandacheNumber.html,
http://mathworld.wolfram.com/Smarandache-WellinNumber.html),
prime numbers (http://mathworld.wolfram.com/SmarandachePrime.html,
http://mathworld.wolfram.com/Smarandache-WellinPrime.html),
and constants (http://mathworld.wolfram.com/SmarandacheConstants.html).

He generalized [1995] the fuzzy, intuitive, paraconsistent, multi-valent, dialetheist logics to the 'neutrosophic logic' (also in the Denis Howe's Dictionary of Computing, England) and, similarly, he generalized the fuzzy set to the 'neutrosophic set' (and its derivatives: 'paraconsistent set', 'intuitionistic set', 'dialethist set', 'paradoxist set', 'tautological set') [http://fs.gallup.unm.edu/ebook-neutrosophics6.pdf].

He coined the words "neutrosophy" [(French *neutre* < Latin *neuter*, neutral, and Greek *sophia*, skill/wisdom) means knowledge of neutral thought] and its derivatives: neutrosophic, neutrosophication, neutrosophicator, deneutrosophication, deneutrosophicator, etc.

In 2003 together with W. B. Vasantha Kandasamy he introduced the Neutrosophic Algebraic Structures, based on sets of Neutrosophic Numbers [i.e. numbers of the form a+bI, where a, b are real or complex numbers, and I = Indeterminacy, with I^n = I for n positive non-null integer, 0I = I, I/I = undefined, and nI+mI = (n+m)I].

In 2006 he introduced the degree of dependence/independence between the neutrosophic components T, I, F.

In 2007 he extended the neutrosophic set *to Neutrosophic Overset (when some neutrosophic component is > 1), and to Neutrosophic Underset (when some neutrosophic component is < 0), and to Neutrosophic Offset (when some neutrosophic components are off the interval [0, 1], i.e. some neutrosophic component > 1 and some neutrosophic component < 0). Then, similar extensions to respectively Neutrosophic Over/Under/Off Logic, Measure, Probability, Statistics etc.*
http://fs.gallup.unm.edu/NeutrosophicOversetUndersetOffset.pdf

Then, introduced the Neutrosophic Tripolar Set and *Neutrosophic Multipolar Set, also the Neutrosophic Tripolar Graph* and *Neutrosophic Multipolar Graph.*

He then generalized the Neutrosophic Logic/Set/Probability to Refined Neutrosophic Logic/Set/Probability [2013], where T can be split into subcomponents $T_1, T_2, \ldots, T_p$, and I into $I_1, I_2, \ldots, I_r$, and F into $F_1, F_2, \ldots, F_s$, where $p+r+s = n \geq 1$. Even more: T, I, and/or F (or any of their subcomponents T_j, I_k, and/or F_l) could be countable or uncountable infinite sets: http://fs.gallup.unm.edu/n-ValuedNeutrosophicLogic-PiP.pdf .

In 2015 he refined the indeterminacy *"I"*, within the neutrosophic algebraic structures, into different types of indeterminacies (depending on the problem to solve), such as $I_1, I_2, , I_p$ with integer $p \geq 1$, and obtained the *refined neutrosophic numbers* of the form $N_p = a+b_1I_1+b_2I_2+ +b_pI_p$ where $a, b_1, b_2, , b_p$ are real or complex numbers, and a is called the determinate part of N_p, while for each k *in* $\{1, 2, , p\}$ I_k is called the k-th indeterminate part of N_p.

Then consequently he extended the neutrosophic algebraic structures to Refined Neutrosophic Algebraic Structures [or Refined Neutrosophic I-Algebraic Structures] (2015), which are algebraic structures based on sets of the refined neutrosophic numbers $a+b_1I_1+b_2I_2+ +b_pI_p$.

He introduced the (T, I, F)-Neutrosophic Structures [2015]. In any field of knowledge, each structure is composed from two parts: a space, and a set of axioms (or laws) acting (governing) on it. If the space, or at least one of its axioms (laws), has some indeterminacy, that structure is a *(T, I, F)*-Neutrosophic Structure. And he extended them to the *(T, I, F)-Neutrosophic I-Algebraic Structures* [2015], i.e. algebraic structures based on neutrosophic numbers of the form $a+bI$, but also having indeterminacy related to the structure space (elements which only partially belong to the space, or elements we know nothing if they belong to the space or not) or indeterminacy related to at least an axiom (or law) acting on the structure space. Then he extended them to *Refined (T, I, F)-Neutrosophic Refined I-Algebraic Structures.*

Together with A. Salama he introduced in 2015 the neutrosophic crisp set and neutrosophic crisp topology [http://fs.gallup.unm.edu/NeutrosophicCrispSetTheory.pdf].

In 2014 he founded together with Mumtaz Ali the Neutrosophic Triplet and introduced the neutrosophic triplet algebraic structures [http://fs.gallup.unm.edu/NeutrosophicTriplets.htm].

In 2016 he founded the Neutrosophic Duplets [http://fs.gallup.unm.edu/NeutrosophicDuplets.htm].

Together with A. R. Vatuiu he enounced the Law that *it is easier to break from inside than from outside a neutrosophic dynamic system* [http://fs.gallup.unm.edu/EasierMaiUsor.pdf].

Also, he proposed an extension of the classical probability and the imprecise probability to the 'neutrosophic probability' [1995], that he defined as a tridimensional vector whose components are real subsets of the non-standard interval]-0, 1+[, introduced the

neutrosophic measure and neutrosophic integral [http://fs.gallup.unm.edu/NeutrosophicMeasureIntegralProbability.pdf],
and also extended the classical statistics to neutrosophic statistics [http://fs.gallup.unm.edu/NeutrosophicStatistics.pdf].

Since 2002, together with Dr. Jean Dezert from Office National de Recherches Aeronautiques in Paris, worked in information fusion and generalized the Dempster-Shafer Theory to a new theory of plausible and paradoxist fusion (Dezert-Smarandache Theory): http://fs.gallup.unm.edu/DSmT.htm .
In 2004 he designed an algorithm for the Unification of Fusion Theories and rules (UFT) used in bioinformatics, robotics, military.

In biology he introduced in 2017 the Theory of Neutrosophic Evolution: Degrees of Evolution, Indeterminacy, and Involution [http://fs.gallup.unm.edu/neutrosophic-evolution-PP-49-13.pdf].

In physics he found a series of paradoxes (see the quantum smarandache paradoxes), and considered the possibility of a third form of matter, called unmatter [2004], which is a combination of matter and antimatter - presented at Caltech (American Physical Society Annual Meeting, 2010) and Institute of Atomic Physics (Magurele, Romania 2011).

Based on a 1972 manuscript, when he was a student in Rm. Valcea, he published in 1982 the hypothesis that 'there is no speed barrier in the universe and one can construct any speed', (http://scienceworld.wolfram.com/physics/SmarandacheHypothesis.html). This hypothesis was partially validated on September 22, 2011, when researchers at CERN experimentally proved that the muon neutrino particles travel with a speed greater than the speed of light.
Upon his hypothesis he proposed an Absolute Theory of Relativity [free of time dilation, space contraction, relativistic simultaneities and relativistic paradoxes which look alike science fiction not fact]. Then he extended his research to a more diversified Parameterized Special Theory of Relativity (1982):
http://fs.gallup.unm.edu/ParameterizedSTR.pdf and generalized the Lorentz Contraction Factor to the Oblique-Contraction Factor for lengths moving at an oblique angle with respect to the motion direction, then he found the Angle-Distortion Equations (1983): http://fs.gallup.unm.edu/NewRelativisticParadoxes.pdf .
He considered that the speed of light in vacuum is variable, depending on the moving reference frame; that space and time are separated entities; also the redshift and blueshift are not entirely due to the Doppler Effect, but also to the Medium Gradient and Refraction Index (which are determined by the medium composition: i.e. its physical elements, fields, density, heterogeneity, properties, etc.); and that the space is not curved and the light near massive cosmic bodies bends not because of the gravity only as the General Theory of Relativity asserts (Gravitational Lensing), but because of the Medium Lensing.
In order to make the distinction between clock and time , he suggested a *first experiment* with different clock types for the GPS clocks, for proving that the resulted dilation and contraction factors are different from those obtained with the cesium atomic clock; and a *second experiment* with different medium compositions for proving that different degrees of redshifts/blushifts and different degrees of medium lensing would result.

He introduced the superluminal and instantaneous physics (domains that study the physical laws at superluminal and respectively instantaneous velocities), and the neutrosophic physics that describes collections of objects or states that are individually characterized by opposite properties, or are characterized neither by a property nor by the opposite of the property. Such objects or states are called neutrosophic entities.

In philosophy he introduced in 1995 the 'neutrosophy', as a generalization of Hegel's dialectic, which is the basement of his researches in mathematics and economics, such as 'neutrosophic logic', 'neutrosophic set', 'neutrosophic probability', 'neutrosophic statistics'. Neutrosophy is a new branch of philosophy that studies the origin, nature, and scope of neutralities, as well as their interactions with different ideational spectra. This theory considers every notion or idea <A> together with its opposite or negation <Anti-A> and the spectrum of "neutralities" <Neut-A> (i.e. notions or ideas located between the two extremes, supporting neither <A> nor <Anti-A>). The <Neut-A> and <Anti-A> ideas together are referred to as <Non-A>. According to this theory every idea <A> tends to be neutralized and balanced by <Anti-A> and <Non-A> ideas - as a state of equilibrium. As a consequence, he generalized the triad thesis-antithesis-synthesis to the tetrad thesis-antithesis-neutrothesis-neutrosynthesis [http://fs.gallup.unm.edu/neutrosophy.htm].

He extended the Lupasco-Nicolescu s *Law of Included Middle* [<A>, <nonA>, and a third value <T> which resolves their contradiction at another level of reality] to the *Law of Included Multiple-Middle* [<A>, <antiA>, and <neutA>, where <neutA> is split into a multitude of neutralities between <A> and <antiA>, such as <neut$_1$A>, <neut$_2$A>, etc.]. The <neutA> value (i.e. neutrality or indeterminacy related to <A>) actually comprises the included middle value. Also, he extended the *Principle of Dynamic Opposition* [opposition between <A> and <antiA>] to the *Principle of Dynamic Neutrosophic Opposition* [which means oppositions among <A>, <antiA>, and <neutA>]; [http://fs.gallup.unm.edu/LawIncludedMultiple-Middle.pdf].

Other small contributions he had in psychology [http://fs.gallup.unm.edu/psychology.htm], and in sociology [http://fs.gallup.unm.edu/sociology.htm].

Invited to lecture at University of Berkeley (2003), NASA Langley Research Center-USA (2004), NATO Advance Study Institute-Bulgaria (2005), Jadavpur University-India (2004), Institute of Theoretical and Experimental Biophysics-Russia (2005), Bloomsburg University-USA (1995), University Sekolah Tinggi Informatika & Komputer Indonesia-Malang and University Kristen Satya Wacana Salatiga-Indonesia (2006), Minufiya University (Shebin Elkom)-Egypt (2007), Air Force Institute of Technology Wright-Patterson AFB in Dayton [Ohio, USA] (2009), Universitatea din Craiova - Facultatea de Mecanica [Romania] (2009), Air Force Research Lab & Griffiss Institute [Rome, NY, USA] (2009), COGIS 2009 (Paris, France), ENSIETA (Brest, Franta) - 2010, Romanian Academy - Institute of Solid Mechanics and Commission of Acoustics (Bucharest - 2011), Guangdong University of Technology (Guangzhou, China) - 2012, Okayama University

of Sciences (Japan) - 2013, Osaka University (Japan) - 2014, Universidad Nacional de Quilmes (Argentina) - 2014, Universidad Complutense de Madrid (Spain) - 2014, Univ. Transilvania Brasov - 2015; Vietnam National University, Le Quy Don Technical University (Hanoi) and Hanoi University, also Ho Chi Minh City University of Technology (HUTECH) and Nguyen Tat Thanh University (Ho Chi Minh City) - 2016, Universidad de Guayaquil (Ecuador) - 2016 etc.
Presented papers at many Sensor or Information Fusion International Conferences {Australia - 2003, Sweden - 2004, USA (Philadelphia - 2005, Seattle - 2009, Chicago - 2011, Washington DC - 2015), Spain (Barcelona - 2005, Salamanca - 2014), Italy - 2006, Belgium - 2007, Canada -2007, Germany (Cologne - 2008, Heidelberg - 2016), Scotland- 2010, Singapore - 2012, Turkey - 2013}.

Presented papers at IEEE GrComp International Conferences (Georgia State University at Atlanta - 2006, Kaohsiung National University in Taiwan - 2011), International Conference on Advanced Mechatronic Systems (Tokyo University of Agriculture and Technology, Japan) - 2012, IEEE World Congress on Computational Intelligence (Vancouver, Canada, 2016), Federal University of Agriculture - Abeokuta & University of Ibadan & University of Lagos (Nigeria, 2017).

He received the 2011 Romanian Academy "Traian Vuia" Award for Technical Science (the highest in the country); *Doctor Honoris Causa* of Academia DacoRomana from Bucharest - 2011, and *Doctor Honoris Causa* of Beijing Jiaotong University (one of the highest technical universities of China) - 2011;
the 2012 New Mexico - Arizona Book Award & 2011 New Mexico Book Award at the category Science & Math (for Algebraic Structures, together with Dr. W. B. Vasantha Kandasamy) on 18 November 2011 in Albuquerque; also, the Gold Medal from the Telesio-Galilei Academy of Science from England in 2010 at the University of Pecs - Hungary (for the Smarandache Hypothesis in physics, and for the Neutrosophic Logic), and the Outstanding Professional Service and Scholarship from The University of New Mexico - Gallup (2009, 2005, 2001).

Very prolific, he is the author, co-author, editor, and co-editor of 180 books published by about forty publishing houses (such as university and college presses, professional scientific and literary presses, such as Springer Verlag (in print), Univ. of Kishinev Press, Pima College Press, ZayuPress, Haiku, etc.) in ten countries and in many languages, and 250 scientific articles and notes, and contributed to over 100 literary and 50 scientific journals from around the world.

He published many articles on international journals, such as: Neural Computing and Applications (Springer), Applied Intelligence (Springer), Fuzzy Sets and Systems (Elsevier), International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems (IJUFKS) [World Scientific], Bulletin of the Research Institute of Technology (Okayama University of Science, Japan), Multiple-Valued Logic - An International Journal (now called Multiple-Valued Logic & Soft Computing) (UK & USA), Zentralblatt F�r Mathematik (Germany; *reviewer*), Nieuw Archief voor Wiskunde (Holland), Advances in

Fuzzy Sets and Systems, International Journal of Social Economics, International Journal of Applied Mathematics, International Journal of Tomography & Statistics (editor), International Journal of Applied Mathematics and Statistics (Editor-in-Chief 2005-2006), International Journal of Pure and Applied Mathematics, Gaceta Matematica (Spain), Intelligencer (Gottingen, Germany); Humanistic Mathematics Network Journal, Bulletin of Pure and Applied Sciences, Progress in Physics (Associate editor), Infinite Energy (USA), Information & Security: An International Journal, InterStat - Statistics on the Internet (Virginia Polytechnic Institute and State University, Blacksburg, USA), American Mathematical Monthly, Mathematics Magazine, Journal of Advances in Information Fusion (JAIF), Advances and Applications in Statistics, Far East Journal of Theoretical Statistics, Notices of the American Mathematical Society, Critical Review (Society for Mathematics of Uncertainty, Creighton University - USA), New Mathematics and Natural Computing (World Scientific), Bulletin of Statistics & Economics, International Journal of Artificial Intelligence, The Icfai University Journal of Physics, Hadronic Journal (USA), Studii si Cercetari Stiintifice (University of Bacau, Romania; associate editor), International Journal of Applied Mathematics and Statistics, Roorkee, India, (editor-in-chief 2005-2006?); Journal of Computer Science and Technology, Symmetry (Basel, Switzerland), Pakistan Journal of Statistics & Operational Research, International Journal of Mathematical Combinatorics, International Journal of Geometry, Studies in Logic Grammar and Rhetoric (Belarus), Global Journal of Science Frontier Research (GJSFR) [USA, UK, India], Int. J. Advanced Mechatronic Systems (Inderscience Publishers), Applied Mechanics and Materials (Trans Tech Publications, Switzerland), etc. and on many IEEE International Conference Proceedings. Some of them can be downloaded from the LANL / Cornell University and the CERN web sites.

During the Ceausescu's era he got in conflict with authorities. In 1986 he did the hunger strike for being refused to attend the International Congress of Mathematicians at the University of Berkeley, then published a letter in the Notices of the American Mathematical Society for the freedom of circulating of scientists, and became a dissident. As a consequence, he remained unemployed for almost two years, living from private tutoring done to students. The Swedish Royal Academy Foreign Secretary Dr. Olof G. Tandberg contacted him by telephone from Bucharest.
Not being allowed to publish, he tried to get his manuscripts out of the country through the French School of Bucharest and tourists, but for many of them he lost track.
Escaped from Romania in September 1988 and waited almost two years in the political refugee camps of Turkey, where he did unskilled works in construction in order to survive: scavenger, house painter, whetstoner. Here he kept in touch with the French Cultural Institutes that facilitated him the access to books and rencontres with personalities.
Before leaving the country he buried some of his manuscripts in a metal box in his parents vineyard, near a peach tree, that he retrieved four years later, after the 1989 Revolution, when he returned for the first time to his native country. Other manuscripts, that he tried to mail to a translator in France, were confiscated by the secret police and never returned.

He wrote hundreds of pages of diary about his life in the Romanian dictatorship (unpublished), as a cooperative teacher in Morocco ("Professor in Africa", 1999), in the Turkish refugee camp ("Escaped... / Diary From the Refugee Camp", Vol. I, II, 1994, 1998), and in the American exile - diary which is still going on.

But he's internationally known as the literary school leader for the "paradoxism" movement which has many advocates in the world, that he set up in 1980, based on an excessive use of antitheses, antinomies, contradictions, paradoxes (http://mathworld.wolfram.com/SmarandacheParadox.html)in creation - both at the small level and the entire level of the work - making an interesting connection between mathematics, philosophy, and literature [http://fs.gallup.unm.edu/a/paradoxism.htm]. He introduced the 'paradoxist distich', 'tautologic distich', and 'dualistic distich', 'paradoxist quatrain' etc. inspired from the mathematical logic

[http://fs.gallup.unm.edu/a/literature.htm].
Literary experiments he realized in his dramas: Country of the Animals, where there is no dialogue!, and An Upside-Down World, where the scenes are permuted to give birth to one billion of billions of distinct dramas!
[http://fs.gallup.unm.edu/a/theatre.htm].
He stated:
"Paradoxism started as an anti-totalitarian protest against a closed society, where the whole culture was manipulated by a small group. Only their ideas and publications counted. We couldn't publish almost anything.
Then, I said: Let's do literature... without doing literature! Let's write... without actually writing anything. How? Simply: literature-object! 'The flight of a bird', for example, represents a "natural poem", that is not necessary to write down, being more palpable and perceptible in any language that some signs laid on the paper, which, in fact, represent an "artificial poem": deformed, resulted from a translation by the observant of the observed, and by translation one falsifies.
Therefore, a mute protest we did!
Later, I based it on contradictions. Why? Because we lived in that society a double life: an official one - propagated by the political system, and another one real. In mass-media it was promulgated that 'our life is wonderful', but in reality 'our life was miserable'. The paradox flourishing! And then we took the creation in derision, in inverse sense, in a syncretic way. Thus the paradoxism was born. The folk jokes, at great fashion in Ceausescu's 'Epoch', as an intellectual breathing, were superb springs.
The "No" and "Anti" from my paradoxist manifestos had a creative character, not at all nihilistic." Paradoxism, following the line of Dadaism, Lettrism, absurd theater, is a kind of up-side down writings!
In 1992 he was invited speaker in Brazil (Universidad do Blumenau, etc.).

He did many poetical experiments within his avant-garde and published paradoxist manifestos: "Le Sens du Non-Sens" (1983), "Anti-chambres/Antipoesies/Bizarreries" (1984, 1989), "NonPoems" (1990), changing the French and respectively English linguistics clich s. While "Paradoxist Distiches" (1998) introduces new species of poetry with fixed form. Eventually he edited three International Anthologies on Paradoxism (2000-2004) with texts from about 350 writers from around the world in many languages.

"MetaHistory" (1993) is a theatrical trilogy against the totalitarianism again, with dramas that experiment towards a total theater: "Formation of the New Man", "An Upside - Down World", "The Country of the Animals". The last drama, that pioneers no dialogue on the

stage, was awarded at the International Theatrical Festival of Casablanca (1995).
He translated them into English as "A Trilogy in pARadOXisM: avant-garde political dramas"; and they were published by ZayuPress (2004).
"Trickster's Famous Deeds" (1994, auto-translated into English 2000), theatrical trilogy for children, mixes the Romanian folk tradition with modern and SF situations.

His first novel is called "NonNovel" (1993) and satirizes the dictatorship in a gloomy way, by various styles and artifice within one same style.

"Faulty Writings" (1997) is a collection of short stories and prose within paradoxism, bringing hybrid elements from rebus and science into literature.

His experimental albums "Outer-Art" (Vol. I, 2000 & Vol. II: The Worst Possible Art in the World!, 2003) comprises over-paintings, non-paintings, anti-drawings, super-photos, foreseen with a manifesto: "Ultra-Modernism?" and "Anti-manifesto"
[http://fs.gallup.unm.edu/a/oUTER-aRT.htm].
Art was for Dr. Smarandache a hobby. He did:
- graphic arts for his published volumes of verse: "Anti-chambres/ Anti-po sies/ Bizarreries" (mechanical drawings), "NonPoems" (paradoxist drawings), "Dark Snow" & "Circles of light" (covers);
- paradoxist collages for the "Anthology of the Paradoxist Literary Movement", by J. -M. Levenard, I. Rotaru, A. Skemer;
- covers and illustrations of books, published by "Dorul" Publ. Hse., Aalborg, Denmark;
- illustrations in the journal: "Dorul" (Aalborg, Denmark).
Many of his art works are held in "The Florentin Smarandache Papers" Special Collections at the Arizona State University, Tempe, and Texas State University, Austin (USA), also in the National Archives of Valcea and Romanian Literary Museum (Romania), and in the Musee de Bergerac (France).

Twelve books were published that analyze his literary creation, among them: "Paradoxism's Aesthetics" by Titu Popescu (1995), and "Paradoxism and Postmodernism" by Ion Soare (2000).
He was nominated by the Academia DacoRomana from Bucharest for the 2011 Nobel Prize in Literature for his 75 published literary books.

Hundreds of articles, books, and reviews have been written about his activity around the world. The books can be downloaded from this
Digital Library of Science: http://fs.gallup.unm.edu/ScienceLibrary.htm
and from the Digital Library of Arts and Letters:
http://fs.gallup.unm.edu/LiteratureLibrary.htm .

As a Globe Trekker he visited 53 countries that he wrote about in his memories. In 2015 he went to an expedition in Antarctica (see his Photo Gallery at:
http://fs.gallup.unm.edu/photo/GlobeTrekker.html).

International Conferences:
First International Conference on Smarandache Type Notions in Number Theory,

August 21-24, 1997, organized by Dr. C. Dumitrescu & Dr. V. Seleacu, University of Craiova, Romania.
International Conference on Smarandache Geometries, May 3-5 2003, organized by Dr. M. Khoshnevisan, Griffith University, Gold Coast Campus, Queensland, Australia.
International Conference on Smarandache Algebraic Structures, December 17-19, 2004, organized by Prof. M. Mary John, Mathematics Department Chair, Loyola College, Madras, Chennai - 600 034 Tamil Nadu, India.

[Presentation by Dmitri Rabounski, Progress in Physics]

Resume

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Victor Christianto, Ir. (Engineer), MTh., D.Div.

https://www.researchgate.net/profile/Victor_Christianto

Education

Oct 2014 – Aug 2015 **Jerusalem Christian Bible College, Malawi (http://www.cypressbiblecollege.org)**

Doctor of Divinity, Theology

Malawi, Malawi

Aug 2011 – Sep 2014 **Satyabhakti Advanced School of Theology, INDONESIA (http://www.sttsati.org/)**

Master of Theology, Theology

, Indonesia

Dec 2008 – Jun 2009 **Institute of Gravitation and Cosmology at Peoples's Friendship University of Russia, at Moscow (www.rudn.ru)**

Msc but not completed, Gravitation and cosmology

Moscow, Moscow, Russia

Aug 1987 – Sep 1992 **Engineering Faculty, Brawijaya State University, INDONESIA (http://www.ub.ac.id)**

Bachelor of Engineering, Engineering

, Indonesia

Thesis

Victor Christianto: *Critical review to Robert Eisenman (Thesis summary)*. 09/2014, Degree: MTh (Master of Theology), Supervisor: Dr. Paskalis Edwin Nyoman Paska & Drs. Gani Wiyono, MTh., Th.M.

Victor Christianto: *TINJAUAN KRITIS TERHADAP PANDANGAN EISENMAN TENTANG KONTRADIKSI ANTARA PAULUS DAN YAKOBUS (Thesis preview)*. 09/2014, Degree: MTh (Master of Theology), Supervisor: Dr. Paskalis Edwin Nyoman Paska & Drs. Gani Wiyono, MTh., Th.M.

Research Experience

Statistics

RG Score	22.61
Publications	240
Reads	20,810
Citations	357

Awards & Grants

Dec 2008	Scholarship: He was granted scholarship in the Institute of Gravitation and Cosmology at the Peoples's Friendship University in Russia, Moscow
Oct 2000	Award: Second national award of Nokia WAP HotHouse Contest

Skills & Activities

Skills Quantum Mechanics, Theoretical Physics, General Relativity, Cosmology, Gravitational Physics, Oracle 9i, MySQL Database, PHP, Maxima software, Microsof sql, Computational Physics, Applied / Experimental Physics, Measurement, Dark Energy, Condensed Matter Theory, Special and General Relativity, Quantum Cosmology, Quantum Field Theory, Gravitation, Astrophysics, Nature of Science, Solar System, Galaxy, Heuristics, Immanuel Kant, Space, Observation, Dark Matter, Fractals, Astronomy & Astrophysics, Cognitive Behavioral Therapy, Electrodynamics, Mathematica, High Energy Physics, Photonics,

	Relativity, Theoretical Particle Physics, High Energy Physics Theory, Theoretical High Energy Physics, Climatology, Papers, Presentations, Early Christian History, Hermeneutics, Theology, Acoustics, Church History, Maxwell, Mathematical Physics, Maxwell's Equations, Culture, Review, Articles, Christian Theology, Classical Archaeology, Foundations of Physics, Logic, Numerics, Physical Cosmology, Covariance, Astroparticle Physics, Nuclear Fusion, Energy, Applied Mathematics, Computer Algebra
Languages	Bahasa, English, Indonesia
Scientific Memberships	International Society of Frontier Science (www.isfs.org.in)
Interests	Database development and design, web development, economics, Christian theology, Dead Sea Scrolls, history of early Christianity, renewable energy technologies, cosmology, electromagnetic theory, DNA

Publication Highlights

Books

Victor Christianto: *Jalan yang Lurus: Manual anak-anak Terang*. June 2017 edited by Victor Christianto, 06/2017; Second Coming Institute, www.sci4God.com.

Victor Christianto: *Sastra Harjendra: Ajaran Luhur dari Tuhan*. June 2017 edited by Victor Christianto, 06/2017; Second Coming Institute, www.sci4God.com.

Victor Christianto: *Six Easy Pieces in Computational Physics: Exploration with Mathematica*. May 2017 edited by Victor Christianto, 05/2017; Second Coming Institute, www.sci4God.com.

Victor Christianto: *Christology Reloaded: Selected Papers 2010-2016*. July 2016 edited by Victor Christianto, 07/2016; www.sci4God.com.

Victor Christianto: *3 in 1: 3 buku dalam 1 file (in bahasa Indonesia)*. 2015 edited by Victor Christianto, 12/2015; Second Coming Institute, www.sci4God.com.

Victor Christianto: *A Biblical Theory of Everything inspired by the Johannine Prologue (cover preview)*. 2015 edited by Ms. Cornelia Schidu, 09/2015; Lambert Academic Publisher (LAP) - Saarbrucken, Germany., ISBN: 978-3-659-78041-7

Victor Christianto: *X-Files dalam Alkitab dan kisah-kisah lainnya (in bahasa Indonesia)*. 2015, Pentecostal day 05/2015; not yet published.

Victor Christianto: *Teologi Gundukan Pasir*. 2014 12/2014; Second Coming Institute, www.sci4God.com.

Victor Christianto: *Seeking a Theory for the End of the World: Introduction to Fractal Vibrating String*. 2014 edited by Ms. Cornelia Schidu, 07/2014; LAP Publishing, Saarbrucken, Germany (http://www.lap-publishing.com)., ISBN: 978-3-659-58074-1, DOI:10.13140/2.1.2289.7603

V. Christianto, Florentin Smarandache: *Die Kunst des Wedelns, F. Smarandache, V. Christianto & Bernd Hutschenreuther*. 2013 edited by Florentin Smarandache, 06/2013; InfoLearnQuest, USA., ISBN: 978-1-59973-055-4

Florentin Smarandache, V. Christianto: *A Journey into Quantization in Astrophysics: A collection of scientific papers*. 01/2013;

F. SMARANDACHE, V. CHRISTIANTO: *NEUTROSOPHIC LOGIC, WAVE MECHANICS, AND OTHER STORIES*. 01/2009; , DOI:10.5281/zenodo.8715

V. Christianto, F. Smarandache: *Cultural Advantage for Cities An alternative for developing countries*. 01/2008;

Florentin Smarandache, V. Christianto: *The Art of Wag*. 01/2008;

F. Smarandache, V. Christianto: *Hadron models and related New Energy issues*. 03/2007; , DOI:10.5281/zenodo.8838

Book Chapters

Journal Publications

Victor Christianto: *On preparation for the Second Coming of Jesus Christ*.

Victor Christianto, Florentin Smarandache: *From Zeldovich Approximation to Burgers' equation: A Plausible Route to Cellular Automata Adhesion Universe*.

Victor Christianto, Florentin Smarandache: *Neutrosophic Regression and Possible Nonlinearity of Hubble Law: Some Preliminary Remarks*.

Victor Christianto, Florentin Smarandache, Yunita Umniyati: *A Newtonian-Vortex Cosmology Model from Solar System to Galaxy to Large Scale Structures: Navier-Stokes-Inspired Cosmography*.

Victor Christianto: *Kepemimpinan Trinitarian*.

victor christianto: *Sekularisme*.

Victor Christianto, Florentin Smarandache, Yunita Umniyati: *Redshift in Lattice-Cellular Models of the Universe: Lindquist-Wheeler and beyond*.

Victor Christianto, Florentin Smarandache, Yunita Umniyati: *Solving Numerically Ermakov-type Equation for Newtonian Cosmology Model with Vortex*.

Victor Christianto, Florentin Smarandache, Yunita Umniyati: *On Syntropy & Precognitive Interdiction Based on Wheeler-Feynman's Absorber Theory*.

Victor Christianto: *Daimonizomai: kerasukan setan dalam PL, PB dan pelayanan masa kini (Demonic Possession in OT, NT and Contemporary Ministry)*.

Victor Christianto, Florentin Smarandache: *A Review of Five Approaches of Quantum Potential Including Madelung Hydrodynamics Formulation*.

Victor Christianto: *Call for Paper - Jurnal Teologi Amreta*.

Victor Christianto, Sergey V Ershkov: *Solving Numerically a System of Coupled Riccati ODEs for Incompressible Non-Stationary 3D Navier-Stokes Equations*.

Victor Christianto, Florentin Smarandache, Yunita Umniyati: *A Short Introduction of Cellular Automaton Universe via Cosmological KdV Equation*.

Victor Christianto: *The True name of the Messiah*.

Victor Christianto, David Widihandojo: *Cin-cai dan Welasan: Ekonomi hospitalitas, suatu reinterpretasi atas Pasal 33 UUD 1945*.

Prespacetime Journal, Victor Christianto, Florentin Smarandache, Yunita Umniyati: *Exploration From Acoustic Analog of Space to Acoustic Sachs-Wolfe Theorem: A Model of the Universe as a Guitar*.

Victor Christianto: *A Theo-Cymatic reading of Prolegomena of St. John's Gospel: And Implications for Cosmology etc*.

Victor Christianto: *Two Applications of Riccati ODE in Nonlinear Physics and Their Computer Algebra Solutions*.

Victor Christianto: *Solving Coupled Riccati ODEs as Solution of Incompressible Non-stationary 3D Navier-Stokes equations*.

Victor Christianto: *Berlaku Adil di tahun baru 2017*.

Victor Christianto: *Natal KPR GKI Blimbing bersama PMK Kairos*.

Victor Christianto: *ILLUMINATI AND MEROVINGIAN*.

Victor Christianto: *DINASTI MEROVINGIAN*.

Victor Christianto, Yunita Umniyati, Sujarwo Silas: *Simulasi Numerik dan Eksperimen Skala Prototip terhadap Sistem Pembangkit Listrik Mikrohidro Vorteks (GWVPP) -- Research Proposal*.

Victor Christianto: *Nonlinear curve as proof of Fermat's Last Theorem: A graphical method*.

Victor Christianto, Yunita Umniyati, Volodymyr Krasnoholovets: *On Plausible Role of Classical Electromagnetic Theory and Submicroscopic Physics to understand and enhance Low Energy Nuclear Reaction (LENR): A Preliminary Review*.

Victor Christianto: *Al-Salafi: Speak the Truth to Power*.

Victor Christianto: *Ringkasan Hasil Survei, �4 Juli 2016*.

Victor Christianto: *Evaluasi Kuesioner Pembangunan Jemaat GKI Blimbing*.

Victor Christianto: *Is it possible to write down SU(2) electrodynamics?*.

Victor Christianto: *Seputar keilahian Yesus Kristus*.

Victor Christianto: *An adventure from Wave Mechanics to Christocentric Cosmology Model*.

Victor Christianto, Yunita Umniyati: *An Extended SU(2) Electrodynamics based on Lehnert's Revised Quantum Electrodynamics: A Preliminary Report*.

Victor Christianto: *Direct Detection of Cosmic Neutrino Background is impossible, Because there is no such thing as Cosmic Singularity*.

Victor Christianto: *Etika altruisme dan Ekonomi kekeluargaan*.

Victor Christianto: *Calling all Stations: Introduction to The Johannine Cosmology*.

Victor Christianto, Yunita Umniyati: *A few comments on Montagnier and Gariaev's work: Omne vivum ex vivo via crebritudo?*.

Victor Christianto, Yunita Umniyati: *Four possible methods to extend Lehnert's screw-shaped photon: Towards Soliton Orbital Angular Momentum Radio (SOAmR)*.

Victor Christianto: *Extending Lehnert's Revised Quantum Electrodynamics to Fractal Media and Cantor Sets: Towards Physics beyond Standard Model*.

Victor Christianto: *Teologi Gundukan Pasir dan Kisah-kisah Lainnya (in bahasa Indonesia)*.

Victor Christianto: *Mutiara di Ladang (spiritual book)*.

Victor Christianto: *Cultural Advantage as a Postcolonial Resistance: Outline of a Paper*.

Victor Christianto: *Bagaimana seorang ilmuwan sebaiknya membaca Alkitab? (Suatu respons terhadap makalah Amos Yong)*.

Victor Christianto, Florentin Smarandache: *An Economic Analogy with Maxwell Equations in Fractional Space*.

Victor Christianto: *A Review of Cancer Electromagnetic Frequency Therapy: Towards Physics of Cancer*. 04/2015; 2(2):8-11., DOI:10.18052/www.scipress.com/IFSL.4.7

Victor Christianto: *String without String: In search of Cosmology Model inspired by Cosmic Christology of the Johannine Prologue (Dissertation Draft ver. 1.2)*.

Victor Christianto: *String without String: How Linearised Einstein's Field Equations lead to wave equation and how to generalize it to fractal case*.

Victor Christianto: *How should a scientist read the Bible? (A response to Amos Yong's paper), Or Between Hermeneutics of Suspicion and Hermeneutics of Respect*.

Victor Christianto: *From Sachs-Wolfe Acoustic Theorem to Fractal Laplace-Beltrami Operator*.

Victor Christianto: *An Exact Solution of modified KdV (mKdV) Equation as a reduction of Self-Dual Yang-Mills theory (BSOMASS, Vol. 3 No. 4, 2014)*.

Victor Christianto: *Microcredit 2.0 Outlook (www.egoro.org)*.

Victor Christianto: *A Note on Shannon Entropy and Temperature of the Earth: or How Information Can Affect the Climate*.

Victor Christianto: *Kesatuan dan Perbedaan dalam Gereja Perdana (IJT Volume 2, Nomor 2, Desember 2014)*.

Florentin Smarandache, V. Christianto: *A Journey into Quantization in Astrophysics*. DOI:10.6084/M9.FIGSHARE.1502517

Victor Christianto: *London-Proca-Hirsch Equations for Electrodynamics of Superconductors on Cantor Sets*. 12/2014; 4., DOI:10.18052/www.scipress.com/ETET.4.1

Victor Christianto: *In Search of Mathematical Model of Cosmic Christology based on Interpretation of the Johannine Prologue (Dissertation Draft version 1.0)*.

Victor Christianto: *Soliton Engineering for New Energy and Quantum Computation*.

Victor Christianto, Biruduganti Rahul: *A Derivation of Proca Equations on Cantor Sets: A Local Fractional Approach*. 11/2014; 3(4)., DOI:10.18052/www.scipress.com/BMSA.10.48

Victor Christianto: *An Exact Solution of Modified KdV (mKdV) Equation as a Reduction of Self-Dual Yang-Mills Theory*. 11/2014; 12., DOI:10.18052/www.scipress.com/BSMaSS.12.1

Victor Christianto, Yunita Umniyati: *An Exact Solution of a Coupled ODE for Wireless Energy Transmission via Magnetic Resonance*.

Victor Christianto: *A Research Proposal concerning Cosmology Model based on Interpretation of the Johannine Prologue*.

Victor Christianto: *An Exact Solution of Riccati Form of Navier-Stokes Equations with Mathematica*.

Victor Christianto, Yunita Umniyati: *A Review of Soliton Solution of sine-Gordon model of DNA*.

Victor Christianto: *Paulus atau Yakobus? Tinjauan Kritis terhadap Pandangan Eisenman (in bahasa Indonesia)*.

Victor Christianto: *Internet Addiction Disorder and Cognitive Behavioral Therapy (in Bahasa Indonesia)*.

Victor Christianto: *An Outline of Cosmology Based on Interpretation of the Johannine Prologue*. 09/2014; 3(3):5-16., DOI:10.18052/www.scipress.com/BSMaSS.11.4

Victor Christianto: *50 questions related to astrophysics, climate, and other issues*.

Victor Christianto: *A Review of Schrödinger Equation & Classical Wave Equation*.

Victor Christianto: *A Derivation of GravitoElectroMagnetic (GEM) Proca-type Equations in Fractional Space*.

Victor Christianto: *The spherical solution of Schrödinger equation does not agree with any experiment: Toward new energy methods based on George Shpenkov's wave equation*.

Florentin Smarandache, V. Christianto: *Hadron models and related New Energy issues*. DOI:10.6084/M9.FIGSHARE.1015552

Florentin Smarandache, R. Khrapko, J. Hutchison, FU Yuhua, V. Christianto: *Unfolding the Labyrinth: Open Problems in Physics, Mathematics, Astrophysics, and Other Areas of Science*. DOI:10.6084/M9.FIGSHARE.1015458

Florentin Smarandache, Vic Christianto: *NEUTROSOPHIC LOGIC, WAVE MECHANICS, AND OTHER STORIES*. DOI:10.6084/M9.FIGSHARE.1014236

Florentin Smarandache, Vic Christianto: *A Journey into Quantization in Astrophysics*. DOI:10.6084/M9.FIGSHARE.1015492

Florentin Smarandache, Vic Christianto, Dmitri Rabounski, Larissa Borissova, Matti Pitkaneny: *Neutrosophic Physics: More Problems, More Solutions*. DOI:10.6084/M9.FIGSHARE.1014237

Florentin Smarandache, Vic Christianto: *Multi-Valued Logic, Neutrosophy, and Schrdinger Equation*. DOI:10.6084/M9.FIGSHARE.1015504

Florentin Smarandache, V. Christianto: *Cultural Advantage for Cities*. DOI:10.6084/M9.FIGSHARE.1015392

Victor Christianto: *From An Exact Solution of 2D Navier-Stokes Equations to a Navier-Stokes Cosmology on Cantor Sets*. DOI:10.5281/zenodo.32308

Florentin Smarandache, V. Christianto, Pavel Pintr: *Quantization and discretization at large scales*. DOI:10.6084/M9.FIGSHARE.1015526

Florentin Smarandache, Vic Christianto: *Quantization in Astrophysics, Brownian Motion, and Supersymmetry*. DOI:10.6084/M9.FIGSHARE.1015505

Victor Christianto: *A.L.I.C.E. with Jesus*.

Victor Christianto: *Why you should believe in Jesus Christ*.

Victor Christianto: *Teologi dan Tantangan Misiologi bagi David Yonggi Cho (in Indonesian language)*.

Victor Christianto: *Are there Alternatives to Dopamine Hypothesis in Order to Explain Schizophrenia?*.

Victor Christianto: *Possible CGLE signatures in solar system: Spiral gravity from spherical kinetic dynamics*.

V Christianto: *A note on Quantization of Galactic Redshift and the Source-Sink model of Galaxies*.

Victor Christianto, Florentin Smarandache: *On Global corporate control, Federal Reserve, and the Great Theft 2007-2010*.

Victor Christianto, Florentin Smarandache: *A Christian Ethics consideration on Nuclear Energy*.

V. Christianto: *A comment on world population growth rate and World3 simulation*.

Victor Christianto, Florentin Smarandache: *On Gödel's incompleteness theorem(s), Artificial Intelligence/Life, and Human Mind*. DOI:10.5281/zenodo.30248

Florentin Smarandache, V. Christianto: *Clan Capitalism, Graph Distance, and Other Issues*. SSRN Electronic Journal 01/2013;, DOI:10.2139/ssrn.2731538

Victor Christianto: *On Primordial rotation of the Universe, Hydrodynamics, Vortices and angular momenta of celestial objects*.

Victor Christianto: *From fractality of quantum mechanics to Bohr- Sommerfeld's quantization of planetary orbit distance*.

V Christianto, F Smarandache: *Is There Iso-PT Symmetric Potential in Nature?*.

Victor Christianto, Florentin Smarandache: *Of intent, citation game, and scale-free networks: A heuristic argument*.

Victor Christianto, Florentin Smarandache: *On the Relation between Mathematics, Natural Sciences, and Scientific Inquiry*.

Florentin Smarandache, V. Christianto: *Observation of Anomalous Potential Electric Energy in Distilled Water Under Solar Heating*.

V. Christianto, Florentin Smarandache: *Potential Use of Lime as Nitric Acid Source for Alternative Electrolyte Fuel-Cell Method*.

Florentin Smarandache, Victor Christianto: *Introduction to SC-Potential*.

Florentin Smarandache, V. Christianto: *Introduction to the Mu-bit*.

Florentin Smarandache, Victor Christianto: *On Global corporate control, Federal Reserve, and the Great Theft 2007-2010*. DOI:10.5281/zenodo.48917

V. Christianto, Florentin Smarandache: *Generalized Quaternion Quantum Electrodynamics from Ginzburg-Landau-Schrodinger type Equation*.

Victor Christianto, Florentin Smarandache: *An Introduction to Biquaternion Number, Schrodinger Equation, and Fractal Graph*.

Florentin Smarandache, V. Christianto: *Unleashing the Quark within: LENR, Klein-Gordon Equation, and Elementary Particle Physics*.

V Christianto, Smarandache: *On recent discovery of new planetoids in the solar system and quantization of celestial system*.

F Smarandache, V Christianto: *Introduction to Smarandache-Christianto (SC) Potential*.

V Christianto, F Smarandache: *A Note on Exchange Rate Management and Gravity Equation: Developing Country's Viewpoint*.

V Christianto, F Smarandache: *On the Meaning of Imaginary Part of Solution of Biquaternion Klein-Gordon Equation*.

V Christianto, F Smarandache: *Numerical solution of Schrödinger equation with PT-symmetric periodic potential, and its Gamow integral*.

Florentin Smarandache, V. Christianto: *Graph Distance, Optimal Communication and Group Stability: A Preliminary Conjecture*.

V Christianto, F Smarandache: *Numerical Result of Supersymmetric Klein-Gordon Equation. Plausible Observation of Supersymmetric-Meson*.

V. Christianto: *Grand design, intelligent designer, or simply God: Stephen Hawking and his hoax*.

V. Christianto: *The emerging clan capitalism in the world*.

V. Christianto, F. Smarandache: *Schroedinger-Langevin Equation with PT-Symmetric Periodic Potential and its Application to Deuteron Cluster*. 04/2010; 3.

F. Smarandache, Vic Christianto: *On Some Novel Ideas in Hadron Physics. Part II*. 04/2010; 2.

V. Christianto, F. Smarandache: *A Derivation of Maxwell Equations in Quaternion Space*. 04/2010; 6(2).

Vic Christianto, Florentin Smarandache: *An Exact Mapping from Navier-Stokes Equation to Schr*.

Florentin Smarandache, Vic Christianto: *The Neutrosophic Logic View to Schr*.

Vic Christianto, Florentin Smarandache: *A New Derivation of Biquaternion Schr*.

Victor Christianto: *Some Implications of Human Genome Research and Its Related Ethical Discourse*.

Victor Christianto: *On Astrometric Data & Time Varying Sun-Earth Distance in Light of Carmeli Metric*. 01/2010; 1(9).

F. Smarandache, V. Christianto: *On Some New Ideas in Hadron Physics*. 01/2010; 1.

Vic Christianto, Diego L. Rapoport, Florentin Smarandache: *Numerical Solution of Time-Dependent Gravitational Schr*.

V Christianto, F Smarandache: *Interpretation of Solution of Radial Biquaternion Klein-Gordon Equation and Comparison with EQPET/TSC Model*.

Vic Christianto, Florentin Smarandache: *A Note on Unified Statistics Including Fermi-Dirac, Bose-Einstein, and Tsallis Statistics, and Plausible Extension to Anisotropic Effect*. 06/2009; 3(2):1076-.

V Christianto, F Smarandache: *Social archive and the role of new media in scientific dissemination: A viewpoint*.

Vic Christianto, F. Smarandache: *Numerical Solution of Quantum Cosmological Model Simulating Boson and Fermion Creation*. 04/2009; 5(2).

V Christianto, F.Smarandache: *A Study of the Schrödinger-Langevin Equation with PT-Symmetric Periodic Potential and its Application to Deuteron Cluster, and Relation to the Self- Organized Criticality Phenomena*.

V. Christianto, M. Pitkanen, F. Smarandache: *A Few Remarks on "The Length of the Day: A Cosmological Perspective"*. 01/2009; 1.

V. Christianto, F. Smarandache: *On PT-Symmetric Periodic Potential, Quark Confinement, and Other Impossible Pursuits*. 01/2009; 5(1).

V. Christianto, F. Smarandache, F. Lichtenberg: *A Note of Extended Proca Equations and Superconductivity*. 01/2009; 5(1).

Florentin Smarandache, V. Christianto: *Cultural Advantage as an Alternative Framework: An Introduction*.

Florentin Smarandache, V. Christianto: *A Neutrosophic Logic View to Schrodinger's Cat Paradox*.

Florentin Smarandache, V. Christianto: *n-ary Fuzzy Logic and Neutrosophic Logic Operators*.

Christianto Vic, Smarandache Florentin: *What Gravity Is. Some Recent Considerations*. 07/2008; 3.

Smarandache Florentin, Christianto Vic: *The Neutrosophic Logic View to Schrodinger's Cat Paradox, Revisited*. 07/2008; 3.

Florentin Smarandache, V. Christianto: *Introduction to Poly-Emporium Theory in Economics*.

V. Christianto, F. Smarandache: *Kaluza-Klein-Carmeli Metric from Quaternion-Clifford Space, Lorentz' Force, and Some Observables*. 04/2008; 4(2).

Florentin Smarandache, V.Christianto: *FIRST LUNAR SPACE BASE 2009*.

V. Christianto, F. Smarandache: *Cultural Advantage for Cities -- An alternative . . .*.

Vic Christianto, Florentin Smarandache: *A note on numerical solution of wireless power transmission with magnetic resonance*.

Vic Christianto, F. Smarandache: *A Note on Computer Solution of Wireless Energy Transmit via Magnetic Resonance*. 01/2008; 1.

V. Christianto, F. Smarandache: *Numerical Solution of Radial Biquaternion Klein-Gordon Equation*. 01/2008; 4(1).

Vic Christianto, Florentin Smarandache: *An Exact Mapping from Navier-Stokes Equation to Schrodinger Equation via Riccati Equation*. 01/2008;

V. Christianto, F. Smarandache: *Thirty Unsolved Problems in the Physics of Elementary Particles*. 10/2007; 3(4).

A. Yefremov, F. Smarandache, V. Christianto: *Yang-Mills Field from Quaternion Space Geometry, and its Klein-Gordon Representation*. 07/2007; 3(3).

Vic Christianto, Florentin Smarandache: *A New Derivation of Biquaternion Schrödinger Equation and Plausible Implications*. 04/2007;

V. Christianto, Rapoport D. L., F. Smarandache: *Numerical Solution of Time-Dependent Gravitational Schördinger Equation*. 04/2007; 3(2).

V. Christianto, F. Smarandache: *Quaternion Relativity, Ehrenfest Paradox, and Finsler-Berwald Metric: Reply to "notes on Pioneer Anomaly Explanation by Satellite-Shift Formula of Quaternion Relativity"*.

V. Christianto, F. Smarandache: *A Note on Unified Statistics Including Fermi-Dirac, Bose-Einstein, and Tsallis Statistics*.

F. Smarandache, V. Christianto: *Less Mundane Explanation of Pioneer Anomaly from Q-Relativity*. 01/2007; 3(1).

Florentin Smarandache, V. Christianto, Fu Yuhua, R. Khrapko, J. Hutchison: *Unfolding the Labyrinth: Open . . .*.

F. Smarandache, V. Christianto: *Plausible Explanation of Quantization of Intrinsic Redshift from Hall Effect and Weyl Quantization*. 10/2006; 2(4).

F. Smarandache, V. Christianto: *A Note on Geometric and Information Fusion Interpretation of Bell's Theorem and Quantum Measurement*. 10/2006; 4.

V. Christianto: *On the origin of macroquantization in astrophysics and celestial motion*. Annales de la Fondation Louis de Broglie 06/2006; 31(1).

V Christianto, F Smarandache: *Social archive and the role of new media in scientific dissemination: A viewpoint*.

F. Smarandache, V. Christianto: *Schroedinger Equation and the Quantization of Celestial Systems*. 04/2006; 2.

F. Smarandache, V. Christianto: *The Neutrosophic Logic View to Schroedinger's Cat Paradox*. 04/2006; 2.

Florentin Smarandache, Victor Christianto: *Introduction to the Mu-bit*.

Victor Christianto: *On the origin of macroquantization in astrophysics and celestial motion (Annales de la Fondation Louis de Broglie, Volume 31, no 1, 2006)*.

Florentin Smarandache, Vic Christianto: *On Gödel's incompleteness theorem(s), Artificial Intelligence/Life, and Human Mind*.

V. Christianto: *A New Wave Quantum Relativistic Equation from Quaternionic Representation of Maxwell-Dirac Isomorphism as an Alternative to Barut-Dirac Equation*. Electronic Journal of Theoretical Physics 01/2006; 3.

V Christianto, F. Smarandache: *Introduction to biquartenion number*.

V Christianto: *Comparison of Predictions of Planetary Quantization and Implications of the Sedna Finding*.

A Cantorian Superfluid, V. Christianto: *A Cantorian Superfluid Vortex and the Quantization of Planetary Motion*. Apeiron (Montréal, Québec) 01/2004;

Victor Christianto: *A Cantorian Superfluid Vortex and the Quantization of Planetary Motion (Apeiron, vol.11, no.1, january 2004)*.

Florentin Smarandache, Vic Christianto: *A Numerical Experiment on Fermat's Theorem*.

V. Christianto: *C. Roy Keys Inc.*.

V Christianto: *The Cantorian Superfluid Vortex Hypothesis*.

V. Christianto, Florentin Smarandache: *pARadOXiSMe-THE GERAKAN SASTRA, SENI DAN FILSAFAT TERAKHIR PADA MILENIUM KEDUA*.

V. Christianto: *Notes on Utility: Some Factors which Contribute to Individual Achievement and Plausible Relation to Welfare*.

V Christianto: *From Van der Waals gas to CMBR spectrum, elementary particles, and LENR: A hypothesis*.

Patents

Conference Proceedings

Victor Christianto, Yunita Umniyati, Volodymyr Krasnoholovets: *Some Novel Features of the Classical Electromagnetic Theory and their possible impact to understand and enhance Low Energy Nuclear Reaction (LENR)*. Fusion Energy, December 2016, Jakarta, Indonesia; 11/2016

Yunita Umniyati, Victor Christianto: *A Non-Particle View of DNA and Its Implication to Cancer Therapy*. ICTAP X, September 2016, Makassar, INDONESIA; 09/2016

Florentin Smarandache, Vic Christianto: *Observation of Anomalous Potential Electric Energy in Distilled Water Under Solar Heating, abstract*. NES11 Meeting of The American Physical Society; 02/2011, DOI:10.13140/2.1.2093.2803

Florentin Smarandache, Vic Christianto: *On recent discovery of new planetoids in the solar system and quantization of celestial system, abstract*. DAMOP11 Meeting of The American Physical Society; 02/2011, DOI:10.13140/2.1.1468.6408

Florentin Smarandache, Vic Christianto: *Is There Iso-PT Symmetric Potential in Nature?, abstract*. NEF10 Meeting of The American Physical Society; 10/2010, DOI:10.13140/2.1.2592.9929

Florentin Smarandache, Vic Christianto: *Numerical Solution of Schrodinger Equation with PT-Symmetric Periodic Potential, and its Gamow Integral, abstract*. NEF10 Meeting of The American Physical Society; 10/2010, DOI:10.13140/2.1.4395.2329

Florentin Smarandache, Vic Christianto: *Generalized Quaternion Quantum Electrodynamics from Ginzburg-Landau-Schrodinger type Equation, abstract*. TSF10 Meeting of The American Physical Society; 09/2010, DOI:10.13140/2.1.3787.7447

Florentin Smarandache, V.Christianto: *Numerical Result of Supersymmetric Klein-Gordon Equation.Plausible Observation of Supersymmetric-Meson, abstract*. NWS10 Meeting of The American Physical Society; 09/2010, DOI:10.13140/2.1.1306.8487

Florentin Smarandache, Vic Christianto: *On the Meaning if Imaginary Part of Solution of Biquaternion Klein-Gordon Equation, abstract*. DPP10 Meeting of The American Physical Society; 09/2010, DOI:10.13140/2.1.4935.9043

Florentin Smarandache, Vic Christianto: *An Introduction to Biquaternion Number, Schrodinger Equation, and Fractal Graph, abstract*. 4CF10 Meeting of The American Physical Society; 09/2010, DOI:10.13140/2.1.1047.7765

Florentin Smarandache, Vic Christianto: *Less Mundane Explanation of Pioneer Anomaly from Q-Relativity, abstract*. 4CF09 Meeting of The American Physical Society; 09/2009, DOI:10.13140/2.1.2522.3364

Florentin Smarandache, Vic Christianto: *Reply to "Notes on Pioneer Anomaly Explanation by Satellite-Shift Formula of Quaternion Relativity", abstract*. DPP09 Meeting of The American Physical Society; 09/2009, DOI:10.13140/2.1.4411.6164

Alexander Yefremov, Florentin Smarandache, Vic Christianto: *Yang-Mills Field from Quaternion Space Geometry, and its Klein-Gordon Representation, abstract*. CAL09 Meeting of The American Physical Society; 09/2009, DOI:10.13140/2.1.4679.9048

Vic Christianto, Florentin Smarandache: *A New Derivation of Biquaternion Schrodinger Equation and Plausible Implications, abstract*. APR10 Meeting of The American Physical Society; 08/2009

Florentin Smarandache, Vic Christianto: *What Gravity Is. Some Recent Considerations, abstract*. NWS09 Meeting of The American Physical Society; 02/2009, DOI:10.13140/2.1.1568.9927

Vic Christianto, Florentin Smarandache: *Kaluza-Klein-Carmeli Metric from Quaternion-Clifford Space, Lorentz' Force, and Some Observables, abstract*. DAMOP09 Meeting of The American Physical Society; 02/2009, DOI:10.13140/2.1.2386.1449

Florentin Smarandache, Vic Christianto: *A Neutrosophic Logic View to Schrodinger's Cat Paradox, abstract*. TS4CF08 Meeting of The American Physical Society; 10/2008, DOI:10.13140/2.1.3263.4568