

## SunQM-9s2: Updates and Corrections for the SunQM Series Articles (Part-2, Drafting Began in 2021)

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### Abstract/Introduction

This is not a research article, but a collection of updates, corrections, terminology normalizations, and questions/answers (Q/A) for my 39 of SunQM series articles that have been posted at the preprint server viXra.org (from April 2018 to February 2026). The suggested reading sequence for these 40 posted SunQM series papers is: SunQM-1, 1s1, 1s2, 1s3, 2, 3, 3s1, 3s2, 3s6, 3s7, 3s8, 3s3, 3s9, 3s4, 3s10, 3s11, 4, 4s1, 4s2, 5, 5s1, 5s2, 7, 6, 6s1, 6s2, 6s3, 6s4, 6s5, 6s6, 6s7, 6s8, 6s10, 6s9, 6s11, 7s1, 7s2, 8, 9s1, and 9s2. During my ~10 years (2014 ~ 2025) closed-door development on the  $\{N,n\}$  QM (through the “global energy minimization” kind of research), some of my early stage work lacks of consistency with the late stage work, and thus needs to be updated and corrected. Those important updates and corrections have mostly been presented in the late stage SunQM articles. The current paper includes the rest updates and corrections (that may be less important). The previous paper (SunQM-9s1: Update ... (part-1)) covered the updates for SunQM-1, 1s1, 1s2, 1s3, 2, 3, 3s1, 3s2, 3s6, 3s7, 3s8, 3s3, 3s9, 3s4, 3s10, 3s11, 4, 4s1, 4s2, 5, 5s1, and 5s2. The current paper (SunQM-9s2: Update ... (part-2)) covers the updates for SunQM-7, 6, 6s1, 6s2, 6s3, 6s4, 6s5, 6s6, 6s7, 6s8, 6s10, 6s9, 6s11, 7s1, 7s2, 8, and 9s1.

Steve Wolfram once mentioned that he developed the online calculator “Wolfram Alpha” for the purpose of democratizing the math [citation at youtube video?]. After I discovered the Solar  $\{N,n//6\}$  QM structure and then built a single master table of  $\{N,n//6\}$  QM structure for our universe (see SunQM-7’s Table-1), I wish that the novel  $\{N,n//q\}$  QM also will democratize the QM theory. The  $\{N,n\}$  QM was built on three building blocks: the Newtonian mechanics (or the classical physics), the Bohr-QM (i.e.,  $r_n = r_1 n^2$  for the H-atom), and the Schrodinger equation/solution for the H-atom. Thus, I also wish that the  $\{N,n\}$  QM (or any fragment of it) can be the useful building material for other scientists (or the scientific community) to build either the more completed QM theories, or the more diversified QM theories.

Note: Because many recent QM text books used the name of “Modern Quantum Mechanics”, in the SunQM articles, the “Modern QM” referred to the mainstream QM theory before 2016 that mainly used the matrix mechanics to describe QM. The “ $\{N,n\}$  QM” was developed since 2016 by mainly using the wave mechanics (that was enlighten by the newly discovered Solar system’s  $\{N,n//6\}$  QM structure). Thus, in the SunQM series articles, the “traditional QM” means the mainstream “Modern QM”, or the “matrix QM”, that relative to the  $\{N,n\}$  QM.

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The previous copyright “© All rights reserved” that was written in the original 37 SunQM series articles is abolished now. In SunQM-8, started from 2/20/2026, I grant the new copyright “CC BY-SA 4.0” to each individua of 37 SunQM series articles (including SunQM-1, 1s1, 1s2, 1s3, 2, 3, 3s1, 3s2, 3s6, 3s7, 3s8, 3s3, 3s9, 3s4, 3s10, 3s11, 4, 4s1, 4s2, 5, 5s1, 5s2, 7, 6, 6s1, 6s2, 6s3, 6s4, 6s5, 6s6, 6s7, 6s8, 6s9, 6s10, 6s11, 7s1, and 7s2), plus SunQM-9s1.

This new copyright granting is because I want all my 37 SunQM series articles that posted at the preprinting server viXra.org can be treated as posted at the preprinting server arXiv.org. According to: <https://info.arxiv.org/help/license/index.html>, “CC BY-SA 4.0: Creative Commons Attribution-ShareAlike. This license allows reusers to distribute, remix, adapt, and build upon the material in any medium or format, so long as attribution is given to the creator. The license allows for commercial use. If you remix, adapt, or build upon the material, you must license the modified material under identical terms”.

**Acknowledgements** (for all articles in the SunQM series):

Many thanks to: all the (related) experimental scientists who produced the (related) experimental data, all the (related) theoretical scientists who generated all kinds of theories (that become the foundation of  $\{N,n/q\}$  QM theory), the (related) text book authors who wrote down all results into a systematic knowledge, the (related) popular science writers who simplified the complicated modern physics results into a easily understandable text, the (related) Wikipedia writers who presented the knowledge in a easily searchable/accessible way, the (related) online (video/animated) course writers/programmers who presented the abstract knowledge in an intuitive and visually understandable way. Also thanks to NASA and ESA for opening (and organizing) some basic scientific data to the public, so that citizen scientists (like me) can use it. Also thanks to the online preprinting serve vixra.org to let me to post out my original SunQM series research articles. Also thanks to the richness of the California state, and thanks to the high level of scientific research and the high level of the popular science education in USA, so that any civilized person in the world (with the good will) can use his own money (practically zero money) to do some studies on the theoretical physics (and using some free public resources).

Special thanks to: Fudan university, theoretical physics (class of 1978, and all teachers), it had made my quantum mechanics study (at the undergraduate level) become possible. Also thanks to Chen-Ning Yang and Tsung-Dao Lee, they made me to dream to be a theoretical physicist when I was eighteen. Also thanks to Shoucheng Zhang (张首晟, Physics Prof. at Stanford University, my classmate at Fudan University in 1978) who had helped me to introduce the  $\{N,n\}$  QM theory to the scientific community in 2018.

Also thanks to a group of citizen scientists for the interesting, encouraging, inspiring, useful, and sometimes even amusing (online) discussions on the quantum mechanics:

“职老” ([https://bbs.creaders.net/rainbow/bbsviewer.php?trd\\_id=1079728](https://bbs.creaders.net/rainbow/bbsviewer.php?trd_id=1079728), “原创: 宏微引力场兼并下的普朗克常数独立推算”);

“mingcheng99” ([https://bbs.creaders.net/tea/bbsviewer.php?trd\\_id=1384562](https://bbs.creaders.net/tea/bbsviewer.php?trd_id=1384562), many educational posts on theoretical physics);

“zhf” ([https://bbs.creaders.net/tea/bbsviewer.php?trd\\_id=1319754](https://bbs.creaders.net/tea/bbsviewer.php?trd_id=1319754), “我与名校物理博士有关单粒子双缝实验的对话”);

Yingtao Yang ([https://bbs.creaders.net/education/bbsviewer.php?trd\\_id=1135143](https://bbs.creaders.net/education/bbsviewer.php?trd_id=1135143), 一个加拿大“学术民科”的心声);

“tda” ([https://bbs.creaders.net/education/bbsviewer.php?trd\\_id=1157045](https://bbs.creaders.net/education/bbsviewer.php?trd_id=1157045), “问一个量子力学物质波相速度的问题, by 五十肩”), etc.

Also thanks to: Takahisa Okino (Correlation between Diffusion Equation and Schrödinger Equation. Journal of Modern Physics, 2013, 4, 612-615), Phil Scherrer (Prof. in Stanford University, who explained WSO data to me (in email, see SunQM-3s9)), Jing Chen ([https://www.researchgate.net/publication/332351262\\_A\\_generalization\\_of\\_quantum\\_theory](https://www.researchgate.net/publication/332351262_A_generalization_of_quantum_theory)), etc.

Also thanks to my family members (especially my wife and my children), who supported me in many different ways during the past years. Also thanks to the “Yahoo Mail” who provided me the free email account for many years (so that I can communicate with other scientists). Also thanks to UCSD library that opened to public so that I can read some text books over there. Note: if I missed anyone in the current acknowledgements, I will try to add them in the future (version-2025) acknowledgements.

Note: A series of SunQM articles (or text book) that I am still working on:

-- SunQM-9s3: Preface for the (version-1) book of “Quantum Mechanics of the Solar System In a  $\{N,n/6\}$  Structure, (a collection of 40 of Yi Cao’s SunQM-research articles)”.

-- Text book (version-3): “Quantum Mechanics of the Solar System In a  $\{N,n/6\}$  Structure (for high-school students)”.

-- Text book (version-4): “Quantum Mechanics of the Solar System In a  $\{N,n/6\}$  Structure”.

Note: Major QM books, data sources, software that I used for the study (in the SunQM series articles):

Douglas C. Giancoli, Physics for Scientists & Engineers with Modern Physics, 4th ed. 2009.

David J. Griffiths, Introduction to Quantum Mechanics, 2nd ed., 2015.

Stephen T. Thornton & Andrew Rex, Modern Physics for Scientists and Engineers, 3rd ed. 2006.

John S. Townsend, A Modern Approach to Quantum Mechanics, 2nd ed., 2012. (Figure 9.11, Figure 10.5)

周世勋, 量子力学教程, (Shi-Xun Zhou, Quantum Mechanics Tutorial) 1979 edition.

Wikipedia at: <https://en.wikipedia.org/wiki/>

(Free) online math calculation software: WolframAlpha (<https://www.wolframalpha.com/>)

(Free) online spherical 3D plot software: MathStudio (<http://mathstud.io/>)

(Free) offline math calculation software: R

Microsoft Excel, Power Point, Word.

Public TV's space science related programs: PBS-NOVA, BBC-documentary, National Geographic-documentary, etc.

Journal: Scientific American.

Note: I am still looking for endorsers to post all my SunQM articles (including the future articles) to arXiv.org. Thank you in advance!

Note: So far, my identity (for the  $\{N,n\}$  QM development) is: a former lecturer of Fudan University, and a (10 years closed-door, 2014 ~ 2025) citizen scientist of California.

Note: With my 38 of SunQM research articles that have been posted out so far, I believe that the framework of the  $\{N,n\}$  QM has been fully established. It is clear now that the  $\{N,n\}$  QM description is suitable not only for the mass field, but also for the force field (or the energy field, etc.). It may even be suitable for the condensed matter physics, and for the bio-QM structure. Thus, my ~10 years of closed-door research phase (2014 ~ 2025) on the  $\{N,n\}$  QM is ended. After that, I will re-write the SunQM articles (~40 of them) in form of a textbook. The initial plan is, Phase-1) Try to formally publish all ~40 of SunQM articles as the original version (version-1, or version-2018) if possible; Phase-2) Using ~2 years, to (globally) revising all ~40 of SunQM articles (as version-2, or version-2025), the main purpose is to unify the nomenclature and the description, to compress the total words from over 450,000 to as less as possible, (and publish it if possible), make it ready for the textbook writing; Phase-3) Using 2 ~ 4 years, to write a Bohr-QM based  $\{N,n\}$  QM textbook (with ~100,000 words, as version-3, for high-school students), formally publish it if possible, and may make a few online video lectures; Phase-4) Using 2 ~ 4 years, to add Schrodinger-equation based  $\{N,n\}$  QM into the version-3 textbook with final ~200,000 words (as version-4, for college students), formally publish it if possible, and may make a few online video lectures. Note: Since August 2025, due to the serious injury at my low back spine, I may be unable to continue this work.

我 65 岁退休了, 身体不好, 腰椎严重退化受损, 希望能回到我的故乡上海的养老院去养老, 在上海养老院的护理院里终老, 最后能葬在故乡上海的公墓里。自题: 闭关自修渡劫生, 参破天机悟空尘。四十年圆量子梦, 八千里归吴越魂。

=== Updates and corrections for the (39 posted) SunQM series articles ===

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[23] SunQM-6: Magnetic Force Is the Rotation-Diffusion (RF) Force of the Electric Force, Weak Force Is the RF-Force of the Strong Force, Dark Matter May Be the RF-Force of the Gravity Force, According to A Newly Designed  $\{N,n\}$  QM Field Theory. <https://vixra.org/pdf/2010.0167v1.pdf> (replaced on 2020-12-17, submitted on 2020-10-21)

#### SunQM-6.update-1

When electric force line is in  $n/0$  mode, the RFe-force-line is in  $nLL$  mode; when electric force line is in  $nLL$  mode, the RFe-force line is in  $n/0$  mode. (Note: see SunQM-6s8's Fig-2 for better explanation).

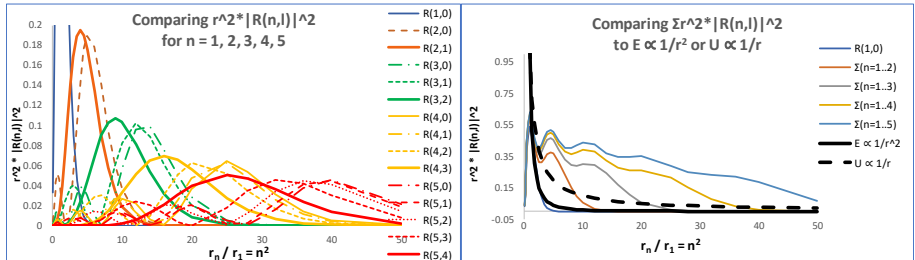
#### SunQM-6.update-2

See SunQM-6s8’s section-V for the explanation of the “galaxy-arm bond”.

SunQM-6.update-3

In SunQM-6’s Fig-2a (Table not published), the calculation for r^2 |R(5,4)|^2 was wrong due to a mis-type (\*16 become 1/16), so the amplitude was decreased by 1/16^4 = 1/65536. Here is the corrected Table, and the figure. (copied from file: “YC-SunQM-6s6-E-G-RF-v1c6-2N-fit-E-U-beutify.xlsx”, 5/3/2023)

Table with columns for r/a\_0, R(n,m), and various summation terms. The table contains numerical data for various parameters and their relationships.



Also wrong in SunQM-6 (unpublished Table), SunQM-5s1 (unpublished Table), but right in SunQM-3, -3s1, -3s7, -3s8, -5, ... However, this mistake gives only minor change in the curve of Σ(n=1..5), and I only used the curve of Σ(n=1..5) for the semi-quantitative illustration in those articles. So no conclusion in these Articles need to be changed (because of this mistake).

SunQM-6.update-4

Wiki “Gravity”, “Flyby anomaly: Various spacecraft have experienced greater acceleration than expected during gravity assist maneuvers”. Wiki “Flyby anomaly”, “The flyby anomaly is a discrepancy between current scientific models and the actual increase in speed (i.e. increase in kinetic energy) observed during a planetary flyby (usually of Earth) by a spacecraft... Possible explanations: ... A dark-matter halo around Earth ...”. Can the Flyby phenomenon be explained by the RFg-force?

SunQM-6.update-5

Section-I may also explain that why no isolated magnetic monopole (i.e., the magnetic equivalent of single electric charges) have ever been observed. This is because the (magnetic field) RFe lines are closed force lines naturally. So there are no “sources” or “sinks” for RFe lines to start or stop on.

**SunQM-6.update-6**

Does bipolar-outflow and astronomic jet mean that, if Figure 10a is correct, then parallel spin caused two nLL(s) (a galaxy center and a star) Rfg attraction (in x-y plane) will also cause these two n/0(s) repelling with each other if they aligned along z-axis? Notice that in SunQM-6s8's Fig-6b, I guessed it to be in attractive.

**SunQM-6.update-7**

In SunQM-6's Fig-8a, a point charge moving in light speed c (in +z direction), its E-force filed propagates in 2c (in +z direction). After Special Relativity, it still propagates in c (in +z direction).

**SunQM-6.update-8**

See SunQM-6s10's section-I for the new and more accurate description for the RF-forces: *In SunQM-6, I re-named the electromagnetic force as the **E/RFe-force**, with the electric force (**E-force**) is the primary force that initially only exert in r-1D space (when it is in static), and the **RFe-force** is the orthogonal companion force of the E-force and initially only exert in  $\theta\phi$ -2D space (when it is in static). Then, the magnetic force is the "**inversed RFe-force**" (that means the RFs-force that is in spinning, translation, or both, so that it produced a new force component in r-1D (together with the  $\theta\phi$ -2D), so we named it as the "**pseudo r-1D**"). That is, the magnetic force is the "inversed RFe-force" that exert in the psedo-r-1D space. Similarly, the gravitational force and the "Dark matter" was paired and re-named as the **G/RFg-force**, with the **G-force** is the primary force that initially only exert in r-1D space (when it is in static), and the **RFg-force** is the orthogonal companion force of the G-force and initially only exert in  $\theta\phi$ -2D space (when it is in static), and the Dark matter is the "**inversed RFg-force**" that exert in the psedo-r-1D space. Similarly, the Strong-force and the Weak-force was paired and re-named as the **S/RFs-force**, with the **S-force** is the primary force that initially only exert in r-1D space (when it is in static), and the **RFs-force** is the orthogonal companion force of the S-force and initially only exert in  $\theta\phi$ -2D space (when it is in static), and the Weak-force is actually the "**inversed RFs-force**" that exert in the psedo-r-1D space.*

**SunQM-6.update-9**

If the Fig-10a is correct, then how can we use the newly "discovered" Rfg-force to do something useful? The novel {N,n//6} QM predicted the existence of four planets {3,n=2..5//6}. After astronomers found them, we may can design a new kind of space probe by using the both anti-G-force and anti-RFg-force (as shown in the figure below): in a xyz coordinate that centered at Sun, the Sun spins along +z axis, all 12 planets orbit the Sun in xy-plane. The new space probe uses a rocket to provide the anti-G-force (of the Sun). However, this rocket force is not through the mass center of the probe, so it causes the probe to spin (in the opposite spin direction of the Sun, or along -z axis) at the same time. This anti-parallel Rfg-RFg spin-spin interaction between Sun-spin and probe-spin is expected to provide the anti-RFg-force between them. To do that, the rocket must be fired briefly when the spinning nozzle is pointing exactly to the Sun, and not fired at other times, so it can provide both the anti-G-force and anti-RFg-force simultaneously.

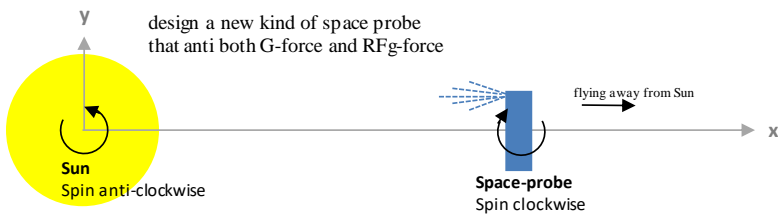


Figure "SunQM-6.update-9". Designing a new kind of space probe that anti both G-force and RFg-force.

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[24] **SunQM-6s1: Using Bohr Atom, {N,n} QM Field Theory, and Non-Born Probability to Describe A Photon's Emission and Propagation.** <https://vixra.org/pdf/2102.0060v1.pdf> (submitted on 2021-02-11)

#### SunQM-6s1.update-1

As corrected in SunQM-6s2, after propagated every one length (that equivalent to the half distance from Sun to Mercury), a 656 nm photon will spit-out a 0.02 Hz low-f photon, and this may relate to the QM entanglement. Before spitting-out, the outmost shell (of the 3D wave packet of the “mother” photon) is entangled with the “mother” photon. After spitting-out, the outmost shell is no longer entangled with the “mother” photon, and it becomes as an independent low-f photon. In the initial inflation stage (of a photo emission and propagation), the wave-front of the photon has a speed of 2x of light speed (in the direction of propagation); and after the inflation stage, the wave-front of the photon has a speed of 1x of light speed (in the direction of propagation, as average, because the 2x speed wave-front is being trimmed-off continually). See more explanations in SunQM-6s2's Fig-9, SunQM-6s3's Table-2, SunQM-6s4's Fig-6c, SunQM-6s5, and SunQM-6s8's Appendix-D. Need to re-do SunQM-6s1's Table-5, using spherical 3D wave packet's wavelength equals to  $2*r_n$  (see the result in SunQM-6s2), then the resulted newborn low-f photon is 0.02 Hz (instead of 0.2 Hz).

#### SunQM-6s1.update-2

For  $\omega_{n,ph} = \left(\frac{n}{2}\right) \omega_n$ , at  $n = 1$ ,  $\omega_{n=1,ph} = \frac{1}{2} \omega_{n=1,gr}$ . So in “Mobius strip” effect, the group wave orbital moving  $720^\circ$  maybe equal to the phase wave orbital moving  $360^\circ$ .

#### SunQM-6s1.update-3

In section-IV, need to mention Douglas C. Giancoli, Physics for Scientists & Engineers with Modern Physics, 4th ed. 2009. p1211, eq-44-5c,  $z+1 = \lambda(obs) / \lambda(rest)$  for  $z+1 = \lambda(ob) / \lambda(em)$ . (Note: I saw this ~2 years after I posted out the SunQM-6s1 paper).

#### SunQM-6s1.update-4

In Fig-1c, the wave phases  $t_0 \sim t_5$  need to be changed to  $t_1 \sim t_5$ , to consist with SunQM-6s2's Fig-5b & Fig-7, and SunQM-6s5's Fig-4.

#### SunQM-6s1.update-5

In SunQM-6 series, all “3D wave packet” need to be changed as “spherical 3D wave packet”.

#### SunQM-6s1.update-6

- 1) In SunQM-6s1, “*We explained a photon's wave-particle duality as that its out-shells have the wave character, while its inner core has the particle character*”.
- 2) In {N,n} QM, moving  $r_1$  more inward, n' become higher number, the description become more particle; moving  $r_1$  more outward, n' become lower number, the description become more wave (or more probability cloud).
- 3) In SunQM-6s4's Fig-6c, for the n shell, the larger the base-n number (but not the high-frequency n' number), the larger the wavelength, the description become more wave (or more probability cloud), and vice versa.
- 4) In SunQM-7's Fig-3a, on a single (and fixed) n shell, the larger the high-frequency n' number, the smaller size each Born probability peak will be (and larger number of Born probability peaks per each fixed one base-n shell will be), then easier to use a series of small peaks to describe a particle's dynamic trajectory. In contrast, the smaller n' number, the larger size each Born probability peak will be (and smaller number of Born probability peaks per each fixed one base-n shell will be), then, the more difficult to use the large-sized peaks to describe a particle's dynamic trajectory, and thus each Born probability peak is more appropriate to be described as the probability density cloud for a particle's location.

#### SunQM-6s1.update-7

See SunQM-6s7's Appendix-A “*Using  $v_{n,ph} = \frac{n}{2} v_{n,gr}$  to update SunQM-6s1's eq-1 through eq-20*”.

$$v_{\text{classical}} = v_{\text{gr}} = \frac{2}{n} v_{\text{ph}}$$

SunQM-6s1's-updated-eq-1

**1) Bohr atom's particle description version:**

$$F_e = \frac{1}{4\pi\epsilon_0} \frac{q^2}{r_n^2}, F_c = m \frac{v_n^2}{r_n}, F_e = F_c, \frac{1}{4\pi\epsilon_0} \frac{q^2}{r_n^2} = m \frac{v_n^2}{r_n}, \text{ or } v_n = \sqrt{\frac{1}{4\pi\epsilon_0} \frac{q^2}{r_n m}},$$

SunQM-6s1's-updated-eq-2

$$E_n = K_n + V_n = \frac{1}{2} m v_n^2 - \frac{1}{4\pi\epsilon_0} \frac{q^2}{r_n} = \frac{1}{2} m v_n^2 - m v_n^2 = -\frac{1}{2} m v_n^2,$$

SunQM-6s1's-updated-eq-3

$$v_{n,gr} = \frac{v_{1,gr}}{n}, \text{ known from traditional QM,}$$

SunQM-6s1's-updated-eq-4

$$\lambda_{n,gr} = n \lambda_{1,gr}, \text{ defined from Bohr Model's and de Broglie wave,}$$

SunQM-6s1's-updated-eq-5

$$v_{n,gr} = n \lambda_{n,gr} f_{n,gr}$$

SunQM-6s1's-updated-eq-6

$$f_{n,gr} = \frac{f_{1,gr}}{n^3},$$

SunQM-6s1's-updated-eq-7

$$E_n - E_{n'} = -\frac{1}{2} m v_n^2 - (-\frac{1}{2} m v_{n'}^2) = -\frac{1}{2} m v_1^2 \left( \frac{1}{n^2} - \frac{1}{n'^2} \right),$$

SunQM-6s1's-updated-eq-8

**2) Bohr atom's (de Broglie) matter wave description version:**

$$\lambda_{n,ph} = 2\pi r_n$$

SunQM-6s1's-updated-eq-9

$$\lambda_{n,ph} = n^2 \lambda_{1,ph}, \text{ or, } \lambda_{n,ph} = 2\pi r_1 n^2$$

SunQM-6s1's-updated-eq-10

$$v_{n,ph} = \lambda_n f_{n,ph}.$$

SunQM-6s1's-updated-eq-11

$$f_{n,ph} = \frac{v_{n,ph}}{\lambda_{n,ph}} = \frac{n v_{n,gr}}{2 n \lambda_{n,gr}} = \frac{n}{2} f_{n,gr}$$

SunQM-6s1's-updated-eq-12

$$E_n = -H m f_{n,ph},$$

SunQM-6s1's-updated-eq-13

$$v_{n,ph} = v_{1,ph}$$

SunQM-6s1's-updated-eq-14

$$f_{n,ph} = f_{1,ph} / n^2$$

SunQM-6s1's-updated-eq-15

$$2\pi f_{n,ph} = \omega_{n,ph},$$

SunQM-6s1's-updated-eq-16

$$E_n - E_{n'} = -H m f_{n,ph} - H m f_{n',ph} = -H m f_{1,ph} \left( \frac{1}{n^2} - \frac{1}{n'^2} \right),$$

SunQM-6s1's-updated-eq-17

$$\Delta f_{n \rightarrow n',ph} = f_{n',ph} - f_{n,ph} = f_{1,ph} \left( \frac{1}{n'^2} - \frac{1}{n^2} \right), \text{ deduced,}$$

SunQM-6s1's-updated-eq-18

$$\lambda_{n \rightarrow n'} = \frac{c}{f_{n,ph} - f_{n',ph}} = \frac{c}{f_{1,ph} \left( \frac{1}{n^2} - \frac{1}{n'^2} \right)}$$

SunQM-6s1's-updated-eq-19

$$f_{n,ph} = \frac{n}{2} f_{n,gr}$$

SunQM-6s1's-updated-eq-20

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[25] SunQM-7: Using {N,n} QM, Non-Born-Probability (NBP), and Simultaneous-Multi-Eigen-Description (SMED) to Describe Our Universe. <https://vixra.org/pdf/2111.0086v1.pdf> (submitted on 2021-11-17)

**SunQM-7.update-1**

Abstract, remove the “return” key after the 1<sup>st</sup> line.

In the beginning of the “Introduction”, add: “In memory of Dmitri Mendeleev, who established the initial “Periodic Table of the Elements” in 1869.

**SunQM-7.update-2**

In the references, the linkers for SunQM-5s2, -6s1, -7, were accidentally added one empty space, need to be removed.

**SunQM-7.update-3**

Appendix-D, Example-3, Earth's inner-inner core ( $r = 650$  km) may explained as it started at  $r = 400$  km, and grows  $r \approx 1$  mm/yr, or, in opposite, it started at  $r \gg 650$  km, and gradually shrink (or planetary differentiation) to 650 km, and then to the final 400 km. (Also see SunQM-3s6.update-3).

#### SunQM-7.update-4

Figure 2b showed that the same electron's  $n = 1$  movement can be further described by many single orbital tracks with all kinds of different eccentricities, inclinations, and precessions. The electron can freely and smoothly switch to any one of these tracks (under the random thermal motion? or through the quantum fluctuation? or determined by the probability of matter-wave interference? or determined by a hidden variable? **Whatever it is, it has to through the fine-step precession, not through the large-step random jumping**), and the electron likes to stay in the dark/thick-line tracks more than the light/thin-line tracks. Also see SunQM-6s2 for better explanation).

#### SunQM-7.update-5

Based on SunQM-5.update-3, in SunQM-7, page 4, "*Inside the Sun core, the  $\{-1,5/6\}$ o orbital shell space is mainly occupied by hydrogen, and it is the H-fusion shell; the  $\{-1,4/6\}$ o and  $\{-1,3/6\}$ o orbital shells are mainly occupied by He; the  $\{-1,2/6\}$ o orbital space is mainly occupied by the electron period 2 and period 3 chemical elements (e.g., C, O, Ne, Si, S, etc.); the  $\{-1,1/6\}$ o orbital space is mainly occupied by Fe and some other electron period 4 chemical elements; the  $\{-1,1/6\}$  sized core space is mainly occupied by the electron period 5, 6, and 7 chemical elements ...*". It should be changed accordingly, not use the electron period, but use the nuclear period to explain.

Also in SunQM-7, page 32, Appendix-D, "*Example-4: The quantum (or major) rip off vs. the continues (or minor) rip off of the planet Mercury. As explained in SunQM-3s6's Table 6, when Mercury was initially formed, it had a core (made of the heavy elements with chemical element's electron period  $\geq 3$ , similar as Earth's current iron core) at the size  $p\{-1,1/4\}$ , with  $r = 1.87E+6$  meters; a (Earth-sized) solid shell (made of the medium-heavy elements with chemical element's electron period  $= 2 \sim 3$ , similar as Earth's current mantle) at the size  $p\{-1,2/4\}$ , with  $r = 7.46E+6$  meters; and an atmosphere shell (made of the light elements with chemical element's electron period  $\approx 1$ , similar as Neptune's current atmosphere) at the size  $p\{-1,4/4\}$ , with  $r = 2.98E+7$  meters; and with the total mass  $\sim 51 \times$  of the current Earth's mass ...*". It should be changed accordingly, not use the electron period, but use the nuclear period to explain.

#### SunQM-7.update-6

Add SunQM-5s2.update-4 into SunQM-5s2's section IV, and SunQM-7's section I-i.

#### SunQM-7.update-7 (added as SunQM-7's section I-k)

In SunQM-7's Table-1, a whole set of  $\{N, n=1..36/6\}$  sized QM structures (36 of them) often uses the same basic building block at  $\{N, 1/6\}$  size, (or  $\{N, 2/6\}$  size, like quark  $\{-17, 2/6\}$  size), and these 36 structures (of  $n = 1..35$ , plus the base-size of  $n=1$ ) constituted a complete set of physical structures of the same kind. The best example is: the physical structure of  $\{-15, n=1..35/6\}$ o, it composed a whole set of atomic nuclides, from He-2 nucleus to Og-118 nucleus, with the building block of nucleon at  $\{-15, 1/6\}$  size (or with H nucleon at  $\{-15, 1/6\}$  size). The other similar examples are:

- 1)  $\{-12, n=1..35/6\}$ o, at the building block of electron shells, it describes all atomic electron shells, from H atom to Og-118 atom, then to the maximum ever possible atom size at  $\{-12, 36/6\} = \{-10, 1/6\}$  size;
- 2)  $\{-5, n=1..35/6\}$ o, at the building block of the "true black hole size", it describes all possible star black hole related structures, from the "true black hole size" at  $\{-5, 1/6\}$  size, to the maximum size at  $\{-5, 36/6\}$  size =  $\{-3, 1/6\}$  size, (note: it is still unconfirmed);
- 3)  $\{-3, n=1..35/6\}$ o, at the building block of the neutron star, it describes all possible highly compressed atom-based (or the fused H-atom-based, or, a collapsed star-based) structures, from the neutron star at  $\{-3, 2/6\}$  size, to the maximum size at  $\{-3, 36/6\}$  size =  $\{-1, 1/6\}$  size (i.e., a white dwarf star);
- 4)  $\{8, n=1..35/6\}$ o, at the building block of the galaxy, it describes a galaxy-based super cluster structure, from the galaxy at  $\{8, 1/6\}$  size, to the maximum size at  $\{8, 36/6\}$  size =  $\{10, 1/6\}$  size (i.e., the Virgo Supercluster);

Based on these  $\{N, n=1..35//6\}$  structure sets, I proposed that there may be a  $\{10, n=1..35//6\}$ o, at the building block of the Virgo supercluster at  $\{10, 1//6\}$  size, up to the maximum size at  $\{10, 36//6\}$  size =  $\{12, 1//6\}$  size, to be a possible higher level QM structure, and that is possible to be a  $\{12, 1//6\}$  sized universe;

Furthermore, in the Standard Model (see SunQM-5s2's Table-1 and Table-2), for the down-type quark, from the first generation down quark  $\{-17, 2//6\}$ o to the second generation down quark (i.e., strange quark)  $\{-16, 2//6\}$ o, then to the third generation down quark (i.e., bottom quark)  $\{-15, 2//6\}$ o, it is also a complete set of  $\{N, n=1..35//6\}$ o.

Then, applying this result to the up-type quark, I concluded that the Charm quark  $\{-15, 1//6\}$ o should be the third (rather than the second) generation of the up-quark  $\{-17, 1//6\}$ o, and the true the true second generation of the up-quark should be  $\{-16, 1//6\}$ o, and it is still missing.

Alternatively,  $\{-17, n=1..35//6\}$ o, at the building block of quark, it describes all quark formed particles, from up-quark to the most stable 3-quark QM structure (i.e., a nucleon at  $\{-17, 36//6\}$  size =  $\{-15, 1//6\}$  size). Note: By using the high-frequency  $n'$ , the quark-based description may extend to  $\{-17, n=1..(6^4-1)//6^4\}$ o, or even  $\{-17, n=1..(6^5-1)//6^5\}$ o. (see SunQM-5s2's Table-4, or Table-5).

Based on  $\{-17, n=1..1295//6\}$ o structure set, (or even  $\{-17, n=1..(6^5-1)//6\}$ o structure set), I proposed that there may be a  $\{10, n=1..1295//6\}$ o, (or  $\{10, n=1..(6^5-1)//6\}$ o), at the building block of the Virgo supercluster at  $\{10, 1//6\}$  size, up to the maximum size at  $\{10, 6^3//6\}$  size =  $\{13, 1//6\}$  size, (or at  $\{10, 6^5//6\}$  size =  $\{15, 1//6\}$  size), to be a possible  $\{13, 1//6\}$  sized universe (or a possible  $\{15, 1//6\}$  sized universe).

### SunQM-7.update-8

Page24, "outside of our universe" → "outside of our universe".

### SunQM-7.update-9

In Table-3, Simultaneous-Multi-Eigen-Description (SMED) means

- 1) Simultaneously for a planet of Earth, and an atom (of Earth), and a nucleon (of Earth), and a quark (of Earth);
- 2) Alternatively, besides a single planet (of Earth, at  $n' = 1.81E+9$ , see in Table-3 Column-16), simultaneously for a group of atoms (of Earth) at  $n' = 3.14E+43$  (with many  $\Delta n'$  that around the  $n'$ ), and a group of nucleon (of Earth) at  $n' = 6.84E+52$  (with many more  $\Delta n'$  that around the  $n'$ ), and a group of quark (of Earth) at  $n' = 1.15E+59$  (with many many more  $\Delta n'$  that around the  $n'$ ).
- 3) Actually, the Simultaneous-Multi-Eigen-Description (SMED) means the superposition of the QM quantum states.

### SunQM-7.update-10

In section IV-a, (suppose our Milky Way galaxy is in the xy-2D plane of a xyz-coordinate, and suppose our Milky Way galaxy's spin axis (i.e., the z axis) never turning around during the last  $9E+9$  lys relative to our universe), then, if our universe is a spherical 3D space with circumference  $2\pi r = 9E+9$  lys, then we should see that

- 1) when looking upward along +z (or -z) axis, all galaxies on the galactic walls (at the distance of  $2\pi r = 9E+9$  lys) should have bottom-up (or top-down) view of spiral (of the Milky Way galaxy);
- 2) when looking sideward along xy-plane, all galaxies on the galactic walls (at the distance of  $2\pi r = 9E+9$  lys) should have side view of spiral (of the Milky Way galaxy);

This may be a criteria to judge whether this model (that our universe is a closed spherical 3D space) is correct or not.

### SunQM-7.update-11

The residue G-G force as the "σ-bond" significantly increased the apparent G-force strength in the galaxy arm region, like the residue E-E force did for the chemical bond. See SunQM-8, and SunQM-6s8's section-V for more explanation.

### SunQM-7.update-12

In eq-1, eq-2, eq-3 and eq-4, the  $\phi$  is the  $\phi$ , so don't need to add another " $\phi$ ". Need to remove the yellow marked " $\phi$ ".

**SunQM-7.update-13** (for myself)

“Thus, if we add the residues forces to the three pairs of forces (so now there are 9 individual forces, instead of 6 individual forces) to form a new vector space, then, our universe cannot be “Eigen described” by this 9 forces formed new vector space  $\{N, n/6\}$  QM (because  $\{N = -10..0, n/6\}$  range does not follow  $\{N, n/q\}$  QM), even though a sub-space of this 9-forces vector space (i.e., the G/RFG, E/RFe, and S/RFs forces formed 6-vector space) is the “Eigenvector” space for describing our universe”. Correct? Wrong?

**SunQM-7.update-14** (for myself)

If the actual size of our universe is at  $\{11, 2/6\}$  given by the cosmic wall, then if the outside  $r_1$  is shrinking, then the “5 of  $\{-15, 2/6\}$  particles” effect may will cause the effective size at  $\{13, 1/6\}$  if choose the galaxy  $\{8, 1/6\}$  as the building block. Or, if the outside  $r_1$  is expanding, then the negative “5 of  $\{-15, 2/6\}$  particles” effect may will cause the effective size at  $\{10, 1/6\}$ .

**SunQM-7.update-15**

The fine-structure, “In the H-atom, the  $2P \rightarrow 1S$  transition is split into two lines corresponding to  $2P_{1/2} \rightarrow 1S_{1/2}$  and  $2P_{3/2} \rightarrow 1S_{1/2}$ , the difference in energy between these two is only about  $5 * E - 5 \text{ eV}$ ”. Check Table-1, we may use this as one of the examples for the  $\{N, n\}$  QM textbook.

**SunQM-7.update-16**

In  $\{N, n\}$  QM, the **holographic effect** (which is one of many natural attributes of the wave mechanics) means: “a small piece of hologram still give the whole picture information (although with low resolution), the large piece gives the more complete information” (see SunQM-3s10). One real example is shown in SunQM-3s10’s Fig-5a, “the spinning Sun’s  $nLL$  QM effect caused the leftover mass ... in  $\{N = 1..4, n/6\}$  region now can be described by radial wave function’s  $r^2 * |R(n, l)|^2$  probability curve in either low, or median, or high resolution ... Under a low resolution description, we can use a single  $n$  valued  $r^2 * |R(n = 2, l = 1)|^2$  probability curve for the whole  $\{N = 1..4, n/6\}$  region, with  $r_1$  at  $\{3, 1/6\}$ , and the maximum mass density at  $\{1, 2/6\}$  (as ... illustration in Figure 5a grey thick-line curve). Under a median resolution description, we can use a single  $n$  valued  $r^2 * |R(n, l)|^2$  probability curve for each  $\{N, n = 1..5/6\}$  super shell region, with  $r_1$  at  $\{N, 1/6\}$  and the maximum mass density at  $\{N, 2/6\}$  (as shown in Figure 5a dashed line curve). Under a high resolution description, we need to use every  $n$  in  $\{N = 1..4, n/6\}$  region, each  $n$  for a  $r^2 * |R(n, l)|^2$  probability curve, with  $r_1$  at  $\{0, 1/6\}$  and maximum mass density at  $\{N, n/6\}$  (as ... illustration in Figure 5a’s solid thin-line curves)”.

In  $\{N, n\}$  QM, the **Simultaneous-Multi-Eigen-Description (SMED)** (which is another one of many natural attributes of the wave mechanics) was defined as: “in SunQM-3s11’s eq-47 through eq-54, we have used the  $\{N, n/6\}$  QM and the Born probability to describe all eight planets (in the Solar system) that are in bound state and doing the circular orbital movement. ... by properly adjusting the high-frequency  $n'$  quantum number (that is based on the base-frequency  $n$  quantum number), those probability formulas not only described planet’s orbital movement (with the base-frequency  $n$  quantum number), but also described planet’s size (with the high-frequency  $n'$  quantum number) at the same time (we named it as the Eigen description, ...). ... by further adjusting the high-frequency  $n'$  quantum number, those equations can also describe the size of either an atom, or a nucleon, or even a quark that is part of that planet (and that is also doing the circular orbital movement around the Sun)”, (see SunQM-7). One real example was shown in SunQM-7’s Table-4 (blue colored cells). SunQM-7’s “eq-4 also describes a celestial body that at orbit of  $\{1, 5/6\}$  with orbital  $r = 1.57E+11$  meters, doing circular orbital movement with period = ...  $\sim 391$  days, and with the body size at  $r_{\text{surface}} \approx 4.55E+6$  meters (...). This set of data closely matches Earth’s orbital  $r = 1.49E+11$  meters, 365 day a year, and  $r_{\text{surface}} = 6.38E+6$  meters. In Table 4, we showed that when re-adjusting the high-frequency quantum number to  $n' = 5 * 6^{56}$ , then  $r_{\text{surface}} (=b) = 3.47E-11$  meters, and it fits to a single H-atom (at size of  $\{-15, 1\}$ ,  $r \approx 5.29E-11$  meters, ...) in Earth quite well, so that eq-3 (...) can also be the Eigen description of any H-atom inside Earth (that orbiting the Sun). Furthermore, when re-adjusting the high-frequency quantum number to  $n' = 5 * 6^{68}$ , then  $r_{\text{surface}} (=b) = 7.44E-16$  meters, and it fits to a single nucleon (at size of  $\{-15, 1\}$ , a proton’s  $r \approx 8.4E-16$  meters, ...) in Earth quite well, so that eq-3 (...) can also be the Eigen description of any nucleon inside Earth (that orbiting the Sun). Again, when re-adjusting the high-frequency quantum number to  $n' = 5 * 6^{76}$ , then  $r_{\text{surface}} (=b)$

=  $5.74E-19$  meters, and it fits to a single quark (at size of  $\{-17,1\}$ ,  $r \approx 6.07E-19$  meters, ...) in Earth quite well, so that eq-3 (...) can also be the Eigen description of any quark inside Earth (that orbiting the Sun)”.

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**[26] SunQM-6s2: A Unified Description Of 1D-Wave, 1D-Wave Packet, 3D-Wave, 3D-Wave Packet, and  $|nLm\rangle$  Elliptical Orbit for A Photon's Emission and Propagation Using  $\{N,n\}$  QM.** <https://vixra.org/pdf/2208.0039v1.pdf>  
(submitted on 2022-08-08)

### SunQM-6s2.update-1

In a pair production, a photon produces an electron and a positron (near an atomic nucleus, see Giancoli's book p996, Figure 37-9). Using the “ $|nL0\rangle$  elliptical/parabolic/hyperbolic orbital transition model”, the nucleus in this reaction provided a  $|nL0\rangle$  elliptical/parabolic/hyperbolic orbital system (that can be described by Schrodinger equation/solution with the center of the coordinate at the nucleus), so that when a photon entered into this (elliptical/parabolic/hyperbolic) system's orbit, at the perihelion site, the core of this photon (after it “decayed” as an electron) fly away (following the elliptical orbit in +x' direction), while spinning-off its outmost shell of the 3D wave packet as a positron in -x' direction.

### SunQM-6s2.update-2

SunQM-6s2's Fig-8d”, e”, f”, actually can be described by Schrodinger equation's solution in nLL QM state (in xy-plane, or in  $\theta = \pi/2$  plane), with n is increasing from 1 to infinity.

### SunQM-6s2.update-3

In H-atom, the electron (at either  $n = 3$  or  $n = 2$ ) is composed of a 3D wave packet with the inner core/shells strongly associated, and the outmost shell loosely associated. Under the “ $|nL0\rangle$  elliptical/parabolic/hyperbolic orbital transition model”, at the perihelion site of the elliptical orbital motion, the high-speed and the sharp-turning causes the  $n = 3$  electron to spin-off its loosely bound outmost shell, and thus the spun-off part becomes a new-born low-f photon (656.1 nm).

### SunQM-6s2.update-4

For the old and decaying low-f photon, if the model in Figure 9 is correct, then, Figure 6b's green curve, and Figures 7c, 7f, 7i, 7l, are all need to be changed accordingly.

### SunQM-6s2.update-5

Change eq-11 through eq-14 according to  $v_{n,ph} = \frac{n}{2} v_{n,gr}$ , the new equations are (Note: these changes may need further optimization):

$$p = mv_{gr}, p_n = mv_{n,gr}, \quad \text{eq-11a}$$

$$K_n = \frac{1}{2} mv_{n,gr}^2 \quad \text{eq-12a}$$

$$p = h/\lambda, p_n = h/\lambda_n, p_{n,gr} = h/\lambda_{n,gr}, p_{n,ph} = h/\lambda_{n,ph}, \quad \text{eq-11b}$$

$$p_{n,gr} = h/\lambda_{n,gr} = h^*n/\lambda_{n,ph} = n p_{n,ph}, \quad \text{eq-11c}$$

$$K_n = \frac{1}{2} mv_{n,gr}^2 = \frac{1}{2} mv_{n,gr} v_{n,ph}(2/n) = mv_{n,gr} v_{n,ph}(1/n), \text{ or, } K_n = p_{n,gr} (v_{n,ph}/n) \quad \text{eq-12b}$$

$$K_n = p_{n,gr} v_{n,ph}(1/n) = n p_{n,ph} v_{n,ph}(1/n), \text{ or, } K_n = p_{n,ph} v_{n,ph} \quad \text{eq-12c}$$

$$K_n = (h/\lambda_{n,ph}) \lambda_{n,ph} f_{n,ph} = h f_{n,ph}, \text{ or, } K_n = h f_{n,ph} \quad \text{eq-12d}$$

$$p_{photon} = hf_{ph}/v_{ph} = hf_{gr}/v_{gr} \quad \text{eq-11d}$$

$$E_{orbit-n} = K_{orbit-n} + V_{orbit-n} = -\frac{1}{2} mv_{n,gr}^2 = -hf_{n,ph} \quad \text{eq-13}$$

$$E_{orbit-n} = -hf_{n,ph} = -(h/m') m f_{n,ph} = -Hmf_{n,ph} \quad \text{eq-14}$$

**SunQM-6s2.update-6**

Electron cloud description may equal to the thermodynamic description of the statistic mechanics, while the electron orbital description may equal to the statistic mechanics description of the thermodynamic.

In SunQM-6s2's Fig-3, the highest uncertainty position is at the perihelion site (in an elliptical orbit). Correspondingly, for a onion-like spherical 3D wave packet, it equivalent to say that the highest uncertainty position is at the core position (of this onion-like spherical 3D wave packet).

**SunQM-6s2.update-7**

In section-II-j, add:

Example-4: The period for the Bohr-H-atom's n=3 electron is  $T_3 = 2\pi r_3/v_3 = 2*3.14*4.76E-10/7.29E+5 = 4.10E-15$  seconds, (see in SunQM-6s1's Table-1). The period for the Bohr-H-atom's n=2 electron is  $T_2 = 2\pi r_2/v_2 = 2*3.14*2.12E-10/1.09E+6 = 1.22E-15$  seconds. So, the emitted 656.1 nm photon's wavelength  $\lambda = c(T_3/2 + T_2/2) = 3E+8 * (4.10E-15 + 1.22E-15)/2 = 7.99E-7 = 799$  nm, not 656.1 nm?

**SunQM-6s2.update-8**

Here is a second way to explain the cosmic red shift (other than a 656.1 nm photon will dis-entangle its (over expanded) outmost shell of the 3D wave packet as a 0.02 Hz low-f photon after every  $\sim 2.7E+10$  meters of propagation). A photon propagates at speed of c, while the size (of its spherical 3D wave packet) expanding at the speed of c (in all 4 $\pi$  direction). So, its 3D wave packet's wave-front propagates at speed of (c + c =) 2c, while its wave-tail propagates at speed of zero (= c - c). As explained in SunQM-6s8.update-2, "to measure a propagating photon, we have to measure (at least) one complete wave length of the 3D wave packet, and this means that only when we have collected the wave-front, wave-center, and wave-tail as a whole, the detector will show that we detected a photon". If this assumption is correct, then for any propagating photon, the last part of the wave tail is always undetectable (because the speed close to zero). Thus, the photon we detected is always lack of a tiny wave-tail, which means, it is red shifted. The longer the distance of the propagation, the larger the size the photon will expand, and the more part of the wave-tail will become undetectable, and the more red-shift the photon will be.

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**[27] SunQM-6s3: Using {N,n} QM and " $|nL0\rangle$  Elliptical/Parabolic/Hyperbolic Orbital Transition Model" to Describe All General "Decay" Processes (Including the Emission of a Photon, a G-photon, or An Alpha-particle).**

(submitted to viXra.org on 2022-08-31, but has not been able to get posted out, I asked many times, no reply. If any QM research scientist needs a copy of SunQM-6s3 paper, please email me at yicaojob@yahoo.com)

**SunQM-6s3.update-1**

Copied the Abstract of SunQM-6s3 to here, because the whole SunQM-6s3 paper (that submitted to viXra.org) was not been posted out (on the website of viXra.org) to the public for unknown reason. "In paper SunQM-6s2, I had designed the " $|nL0\rangle$  elliptical orbital transition model", and (conceptually) unified all four wave descriptions (1D-wave, 1D-wave packet, 3D-wave, and 3D wave packet) for a photon's emission and propagation, and also correlated its formation to the electron's orbital movement in H-atom. In the current paper, I extended this model to be the " $|nL0\rangle$  elliptical/parabolic/hyperbolic orbital transition model". By doing so, we may can use a single model to (qualitatively) describe all general "decay" processes, including the alpha decay, beta decay, gamma decay, a Gravitational photon (G-photon) emission during the Triton orbital transition, the X-ray formation in the X-ray binary, the astrophysical jet formation, a photon emission from a H-atom, the red-shifting of an (old) photon, the Compton scattering, the photoelectric effect, etc., or even the gravitational wave. Furthermore, under the {N,n} QM, any particle (or any celestial body) is made of 3D wave packet with multiple shells and a core, and all general "decay" processes are described as the outmost shell of the 3D wave packet of the particle (or the celestial body) is spun-off from its main body (or the parent particle), and formed a low-f newborn "particle". Because the spun-off outmost shell has the largest size (among all other shells), it has the longest

wavelength and thus the lowest frequency (i.e., low-f) and the lowest energy (i.e., the rest energy, or the rest mass), so that the mass of the low-f newborn particle is always much smaller (or even massless) than the daughter particle. This multi-shells of {N,n} QM structure fits to the wave-particle duality perfectly. This model also (conceptually) unified the description of the circular/elliptical orbit to the parabolic/hyperbolic orbits, or even to a scattering orbit (under the framework of Schrodinger equation and solution, i.e., the Born probability and/or non-Born probability density description). This paper also showed that due to many particles have the intrinsic property of decaying, the cosmic red-shift may can be explained as one kind of general “decaying” process of an (old) photon. Thus, the “expanding Universe” model is not the only explanation for the cosmic red-shift (Note: this is only a citizen scientist-leveled guess)”.

**SunQM-6s3.update-2**

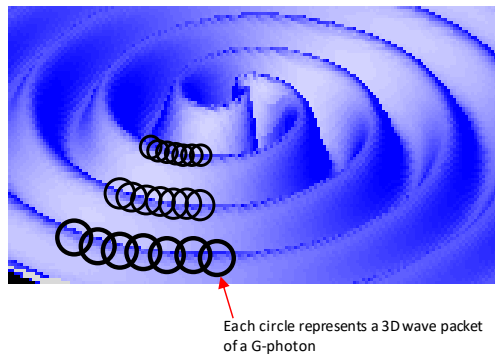
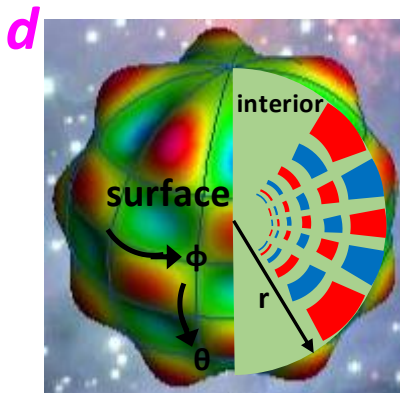
Table2’s Row-9 was updated.

	high-Energy "parent"	low-Energy "daughter"	low-f "newborn"
photon cosmic red-shift	656.1 nm	red-shifted 656.1 nm	0.02 Hz photon
Photon emission (in H-atom): electron spin-off its outmost shell as a photon	n=3 electron	n=2 electron	656.1 nm photon
alpha decay	<sup>210</sup> <sub>84</sub> Po	<sup>206</sup> <sub>82</sub> Pb	alpha particle
beta decay	neutron	proton	electron, antineutrino
gamma decay	<sup>12</sup> <sub>6</sub> C*	<sup>12</sup> <sub>6</sub> C	gamma particle
Triton captured by Neptune, spin-off a G-photon	Triton {2,6} orbit	Triton (moon) {2,5} orbit	G-photon, λ=2.26E+18 meters
merge of binary black holes, spin-off many G-photons	minor black hole at high-E orbit	minor black hole at low-E orbit	G-photons, λ < 1.5E+6 meters
Black hole -companion star binary, emit X-ray	companion star's inoic matter (high speed)	companion star's inoic matter (decelerated)	X-ray photons
Astrophysical jet	companion star's matter at high-E orbit	companion star's matter at low-E orbit	newborn particles

**SunQM-6s3.update-3**

SunQM-6s9’s Fig-2d, Schrodinger equation’s solution (i.e., wave function) has a sine-like wave in each of the r-1D, θ-1D, and φ-1D.

For the gravitational wave shown in SunQM-6s3’s Fig-2b, it is composed by many (sine-like) wave functions, each with different n (meaning different frequency for the sine-like wave), to form a series of 3D wave packets (that distributed on the two spiral lines, or to form the two spiral lines). As the result, for this gravitational wave, (I guessed that) not only in r-1D all these 3D wave packets further forms a sine-like wave; but also along the each one of the two spiral lines, these 3D wave packets also forms a sine-like wave. Furthermore, after carefully thinking, in θ-1D, all these 3D wave packets of this gravitational wave formed |2,1,1> QM state (or nLL QM state), with the maximum peak (of the sine-like wave) at θ = π/2. In φ-1D, (e.g., at θ = π/2 with a fixed r), all these 3D wave packets of this gravitational wave also formed a sine wave, (note: for a two spiral lined gravitational wave shown in SunQM-6s3’s Fig-2b, at a fixed r in φ-1D, this sine wave is always having a frequency of 2 per 360°, because of the fixed-r circular-line cuts the two spiral-lines).





(qualitatively) describe all general “decay” processes, including the alpha decay, beta decay, gamma decay, a Gravitational-photon (G-photon) emission during the Triton orbital transition, the X-ray formation in the X-ray binary, the astrophysical jet formation, a photon emission from a H-atom, the red-shifting of an (old) photon, the Compton scattering, the photoelectric effect, etc., or even the gravitational wave. After the “mother particle” decayed to a “daughter particle”, the spun-off outmost shell formed a low-f “newborn particle”. Because the spun-off outmost shell has the largest size (among all other shells), it has the longest wavelength and thus the lowest frequency (i.e., low-f) and the lowest energy (i.e., the rest energy, or the rest mass), so that the mass of the low-f “newborn particle” is always much smaller (or even massless) than the “daughter particle”. This multi-shells of  $\{N,n\}$  QM structure fits to the wave-particle duality perfectly. This model also (conceptually) unified the description of the circular/elliptical orbit to the parabolic/hyperbolic orbits, or even to a scattering orbit (under the framework of Schrodinger equation and solution, i.e., the Born probability and/or non-Born probability density description). (See SunQM-6s2, -6s3).

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**[28] SunQM-6s4: In  $\{N,n\}$  QM Field Theory, A Point Charge’s Electric Field Can Be Represented by Either the Schrodinger Equation/Solution, Or A 3D Spherical Wave Packet, In Form of Born Probability.**

<https://vixra.org/pdf/2306.0136v1.pdf> (submitted on 2023-06-23)

**SunQM-6s4.update-1**

More detailed explanation on SunQM-6s4’s Fig-6c. Using  $n=3$  as the example, when  $\sim 100\%$  mass-occupancy, the mass fills in all  $|3,0,m\rangle$ ,  $|3,1,m\rangle$ ,  $|3,2,m\rangle$  QM states, so that it forms a solid mass ball (or a spherical shell) with  $r$  up to  $r_{n+1}$ ; when  $< 1\%$  mass-occupancy, the little mass only concentrated at all  $|3,2,2\rangle$  QM states, so that it only forms a ring at  $r = r_{n=3}$  (because the radial Born probability density function at  $|3,2,m\rangle$  QM states, i.e.,  $r^2 * |R(3,2)|^2$ , has the maximum at  $r = r_{n=3}$ ). (Also see SunQM-6s10’s Appendix-F).

**SunQM-6s4.update-2**

SunQM-7s1 used “space density” to describe the curvature of the space near by a black hole: the higher the curvature, the denser the space will be. Then, Schrodinger equation/solution provides a good description not only for the mass field, but also for the force field, the energy field, the “space density” field (and/or a “space curvature” field).

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**[29] SunQM-6s5: Using  $\{N,n\}$  QM Field Theory to Describe A Propagating Photon as A 3D Spherical Wave Packet with the Oscillation Among Three QM States. <https://vixra.org/pdf/2307.0098v1.pdf> (submitted on 2023-07-18)**

**SunQM-6s5.update-1**

Change citation [32] to

[32] David J. Griffiths, Introduction to Quantum Mechanics, 2nd ed., 2015, p362, eq-9.78, and Figure 9.6.

**SunQM-6s5.update-2**

SunQM-6s5’s Appendix-H is changed as: “In “ $|nL0\rangle$  Elliptical/Parabolic/Hyperbolic Orbital Transition Model”, the spin-off newborn may change the fly-away direction from  $+x$  to  $+z$ . (Note: This Appendix should go to SunQM-6s3).

In the “ $|nL0\rangle$  Elliptical/Parabolic/Hyperbolic Orbital Transition Model”, when a (mother) particle moving to the perihelion site of an (extreme) elliptical orbit (that has extremely high eccentricity), it spin-off a daughter and a newborn. Initially, the newborn is always fly-away in the tangential ( $+x$ ) direction. Then,

- 1) If the newborn is not attracted by the daughter, it will keep the fly-away trajectory in the  $+x$  direction. For example, a 656.1 nm photon fly away from the H-atom's  $n=2$  electron (because the photon is not attracted by the proton/electron).
- 2) However, if the newborn is still attracted by the mother/daughter, it will change the fly-away trajectory to the near  $+z$  direction. Example-1, In  $\alpha$ -decay (see SunQM-6s3's Fig-5b), because of the newborn  $\alpha$  particle is still initially attracted by the daughter particle, so the newborn  $\alpha$  particle changed fly-away direction from  $+x$  to the near  $+z$  direction. Example-2, a 0.02 Hz low-f photon is spun-off from a 656.1 nm photon (see SunQM-6s3's Fig-8), because of the newborn is still initially attracted by the daughter (the red-shifted 656.1 nm photon), so it changed fly-away direction from  $+x$  to the near  $+z$  direction.

Figure 12. Omitted".

### SunQM-6s5.update-3

SunQM-6s5's Appendix-i changed to only use Fig-13a for the explanation. Fig-11 is modified.

### SunQM-6s5.update-4

In Fig-8, for an in-coming photon, I guessed that we still see something like Figure 8c. This is because to see a photon, we need to obtain a complete full wavelength of the photon's 3D wave packet. So, suppose that the center of the in-coming photon arrives to an observer at  $t = 0$ , then at  $t = -3, -2, -1, 0$ , the observer do not see a (in-coming) photon (even though he sensed something). Only at  $t = 1, 2, 3, \dots$ , he then see a 656 nm photon (because his eye has collected the full one wavelength of the photon's 3D wave packet, and thus he knows the wavelength of this photon).

Then, according to SunQM-6s2's Fig-9, for an old and decaying 656 nm photon, right after detecting it, we then should be able to detect a (independent) 0.02 Hz low-f photon that lag behind it. (Note: see SunQM-6s8's Appendix-B for how to confirm and use this effect).

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[30] SunQM-6s6: Using  $\{N,n\}$  QM Field Theory to Study the Atomic Electron Configuration, the Pre-Sun Ball's  $\{N,n\}$  QM Structural Configuration, and the Nuclear Proton Configuration. <https://vixra.org/pdf/2308.0118v1.pdf> (submitted on 2023-08-18)

### SunQM-6s6.update-1

The r-1D attractive potential energy formula (used in Schrodinger equation/solution for H-atom) may intrinsically enforced that  $\theta\phi$ -2D space must also be under the attractive force. This is the simplest reason why the Schrodinger equation/solution for H-atom fits to pre-Sun ball perfectly and does not fit to  $Z > 1$  atoms' s, p, d, sub-shell orbital sequence.

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[31] SunQM-6s7: The Face-to-face Tidal-locked Binary Orbital Rotation May Be the Origin of the Electron Spin and the Nucleon Spin. <https://vixra.org/pdf/2310.0119v1.pdf> (submitted on 2023-10-25)

### SunQM-6s7.update-1

Besides the Pluto-Chiron binary, the planet Earth and the Australia continent (that on Earth's surface) can also be treated as a pair of the face-to-face tidal-locked binary that is doing orbital motion (just think that the Australia continent is positioned on the Earth's surface but is not attached to the Earth).

In SunQM-6s10's section-III, *The "face-to-face tidal-locked (spin  $\uparrow\uparrow$ ) binary orbital motion" is the root of ... so it is one of the nature attributions of the QM*, I said: "... and this neutron is still can be treated as a (closely contacted) proton-

electron binary, and they are still doing the face-to-face tidal-locked binary orbital motion. This is like that the planet Earth and the Australia continent can be treated as a (closely contacted) binary that is doing the face-to-face tidal-locked binary orbital motion (around their reduced mass center)". Based on this, any two parts inside a spinning Earth (or inside a spinning proton, etc.), can be treated as that they are doing the face-to-face tidal-locked binary motion.

### SunQM-6s7.update-2

"According to the Schrodinger equation's solution (i.e., the NBP, or the  $Y(l,m)$  function, for example, by comparing  $Y(l=1,m=1) = -\sqrt{\frac{3}{8\pi}} e^{im\varphi} \sin \theta$ , with,  $Y(l=1,m=-1) = \sqrt{\frac{3}{8\pi}} e^{-im\varphi} \sin \theta$ ), I guessed that these two  $\uparrow\downarrow$  spin  $n=1$  electrons should be doing orbital rotation in opposite directions (meaning, one in  $+m$  direction, one in  $-m$  direction, both in  $\varphi$ -1D)".

Change to:  $Y(l=1,m=1) = -\sqrt{\frac{3}{8\pi}} e^{im\varphi} \sin \theta = -\sqrt{\frac{3}{8\pi}} e^{i\varphi} \sin \theta$ , with,  $Y(l=1,m=-1) = \sqrt{\frac{3}{8\pi}} e^{im\varphi} \sin \theta = \sqrt{\frac{3}{8\pi}} e^{-i\varphi} \sin \theta$

### SunQM-6s7.update-3

An alternative explanation for Figure 1b: in  $n = 3$  shell, the  $l = 0$  sub-shell's one pair of  $\uparrow\downarrow$  electrons can be represented as that their  $[x,y,z]$  are at  $[\pm 1,0,0]$  position; the  $l = 1$  sub-shell's three pairs of  $\uparrow\downarrow$  electrons can be represented as that their  $[x,y,z]$  are at  $[\pm 1,0,0]$ ,  $[0,\pm 1,0]$ , and  $[0,0,\pm 1]$  positions, or, at the six faces of a cube. For a  $n = 4$  shell, the  $l = 3$  sub-shell's seven pair of  $\uparrow\downarrow$  electrons (total 14) be represented as that their  $[x,y,z]$  are at the six faces of a cube and eight corners of the same cube. However, I don't know the simple geometry for the 10 electrons (or 5 pairs) in  $l = 3$  sub-shell.

### SunQM-6s7.update-4 (only for myself)

In the posted SunQM-6s7's section-I, all equations from eq-1 to eq-25 looks good, although  $\lambda_{n,gr} = n\lambda_{1,gr}$ ,  $v_{n,gr} = 2\pi r_n f_{n,gr} = n\lambda_{n,gr} f_{n,gr}$ ,  $\lambda_{phot,ph} = 2\lambda_{phot,gr}$ , looks strange. I believed that these equations are not in the Eigen form. So, I tried many times to deduce out the Eigen form for eq-1 through eq-25.

In the Try-7 version, I enforced:  $v_{n,ph} = \frac{n}{2} v_{n,gr}$ , and  $f_{n,ph} = \frac{f_{1,ph}}{n^2}$ , to make  $E_n - E_{n'} = -Hmf_{n,ph} - (-Hmf_{n',ph}) = -Hmf_{1,ph} \left( \frac{1}{n^2} - \frac{1}{n'^2} \right)$  correct. And, to make the angular frequency to be right

$$\omega_{n,gr} = 2\pi f_{n,gr} = 2\pi r_n f_{n,gr} / r_n = v_{n,gr} / r_n, \quad \text{eq-x16}$$

$$\omega_{n,ph} = 2\pi f_{n,ph} = 2\pi r_n f_{n,ph} / r_n = v_{n,ph} / r_n = (n/2) v_{n,gr} / r_n, \quad \text{eq-x17}$$

$$\omega_{n,ph} = (n/2) \omega_{n,gr}, \text{ or, } f_{n,ph} = (n/2) f_{n,gr}, \quad \text{eq-x18}$$

$$\lambda_{n,gr} = 2\pi r_n, \text{ and } v_{n,gr} = 2\pi r_n f_{n,gr} = \lambda_{n,gr} f_{n,gr},$$

$$\lambda_{n,ph} = 2\pi r_n, \text{ and } v_{n,ph} = \lambda_{n,ph} f_{n,ph}$$

$$\text{Some deduced result: } f_{n,gr} = \frac{f_{1,gr}}{n^3}, f_{n,ph} = \frac{f_{1,ph}}{n^2}, v_{n,ph} = v_{1,ph}, \lambda_{n,gr} = n^2 \lambda_{1,gr}, \lambda_{n,ph} = n^2 \lambda_{1,ph}$$

Result of Try-7: it does not work. Unable to deduced out  $E_n = K + V = \frac{-1}{2} m v_{n,gr}^2 = -Hmf_{n,ph}$ , only can deduce out  $E_n = K + V = \frac{-1}{2} m v_{n,gr}^2 = -\frac{Hn}{n} m f_{n,ph}$ . So, try-7 failed. I need to do more tries in the future.

### SunQM-6s7.update-5 (only for myself)

In Try-8, besides the pre-requests in Try-7, I want to try  $f_{3,gr} - f_{2,gr} = f_{2,433,gr}$ , and,  $E_n = -Hmf_{n,gr}$ . Result of Try-8: it did not work. I need to do more tries in the future.

### SunQM-6s7.update-6

In Appendix-D, "{-12,1//6}o = {-13,n=6..11//6}o = {-14,n=(6..11)\*6//6^2}o = {-15,n=(6..11)\*6^2//6^3}o = {-16,n=(6..11)\*6^3//6^4}o = {-17,n=(6..11)\*6^4//6^5}o", changed to "{-12,1//6}o = {-13,n=6..11//6}o = {-14,n=(6..11)\*6//6}o = {-15,n=(6..11)\*6^2//6}o = {-16,n=(6..11)\*6^3//6}o = {-17,n=(6..11)\*6^4//6}o".

### SunQM-6s7.update-7

All "spin-speed" should be changed to "spin-frequency".

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**[32] SunQM-6s8: {N,n} QM Field Theory Development on the E/RFe-force, the G/RFG-force, and the Spin-spin Interaction.** <https://vixra.org/pdf/2311.0147v1.pdf> (submitted on 2023-11-29)

#### SunQM-6s8.update-1

(This should go to SunQM-6s8's Appendix-B "A possible way to detect the low-f photon for an old and decaying  $\gamma$  ray (or x ray) photons"). Once we measured out the frequency of a  $\gamma$ -ray's low-f photon, then we know the wavelength of this low-f photon (that is the diameter of the outmost shell of the spherical 3D wave packet), and then we may can determine the r-1D expansion speed of a propagating photon ball, whether it is in the lightspeed  $c$  or it equals to  $c/(2\pi)$ , (see SunQM-6s8's section I-a).

#### SunQM-6s8.update-2

(Cancelled).

#### SunQM-6s8.update-3

For the mass field, either, 1) On the Sun surface, the mass ejects out in the r-1D in all  $4\pi$  direction simultaneously, or, 2) At the Sun's outside space, the mass is forced to orbiting the Sun, in a (circular) orbital nLL mode. This is much like in a G/RFG-force (or E/RFe-force) field, the G-force radiate out in the r-1D in all  $4\pi$  direction simultaneously, and the RFG-force is in a (circular) orbital nLL mode.

#### SunQM-6s8.update-4

For a static single point charge's E/RFe-force, are there many E-force lines radiate out in the r-1D in all  $4\pi$  direction simultaneously, or, it has only one single E-force line that is doing RF to all  $4\pi$  direction? Based on the model in "SunQM-8.update-4", my best explanation is, all three (single point-centered) primary forces (E-, G-, S-force) have the near-field with many force-lines radiating out in the r-1D in all  $4\pi$  direction simultaneously, and have the far-field with all the force-line redistributed according to the surrounding environment.

#### SunQM-6s8.update-5

In SunQM-6s8's Figure-2a, we used  $n=4$  to describe a point-centered E-force field at either high speed of translation (represented as  $|4,3,0\rangle$ , if in light speed) or high speed of spin (represented as  $|4,3,3\rangle$ , if in light speed spinning), it really means the superposition of the  $|4,3,m\rangle$  QM states (where  $m = 0, \pm 1, \pm 2, \pm 3$ ). That means, an E-force can be either 100% in  $|4,3,0\rangle$  while 0% in  $|4,3,3\rangle$ , or 50% in  $|4,3,0\rangle$  plus 20% in  $|4,3,1\rangle$  plus 15% in  $|4,3,2\rangle$  plus 15% in  $|4,3,3\rangle$ , or 0% in  $|4,3,0\rangle$  while 100% in  $|4,3,3\rangle$ . It cannot be 100% in  $|4,3,0\rangle$  while 100% in  $|4,3,3\rangle$ . This means an E-force cannot be both at lightspeed of translation and lightspeed of spinning. (Note: this is my citizen-scientist-leveled guess). This rule should also apply to SunQM-6s8's Figure-1.

This rule should also apply to SunQM-6s8's Figure-2b (where  $n=4$  was used to describe a RFe-force at the light speed of either translation or spinning).

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**[33] SunQM-6s9: Reformulating Schrodinger Equation/Solution to Show Its r-1D Reversed-Diffusion Character for Solar System's {N,n} QM Structure Formation (Drafted in January 2020).** <https://vixra.org/pdf/2312.0101v1.pdf> (submitted on 2023-12-19)

#### SunQM-6s9.update-1

In Fig-3a, “a “super-shell by super-shell” of step-by-step quantum expansion for the exploded matter of a supernova”, matches to SunQM-7’s Fig-6a, “An expanding universe started from a big bang, accelerated exploding universe”.

### SunQM-6s9.update-2

In SunQM-6s9’s Fig-2d (that illustrating Schrodinger equation’s solution (i.e., the wave function) has a sine-like wave in each of the r-1D,  $\theta$ -1D, and  $\phi$ -1D), add Figure-2e (as shown below), to illustrate that “When plotting the R(r) curve vs. r, at the outside of Sun (or planet) surface, the r is logarithmically compressed with the formula:  $r (r > b) = b + \log(r - b)$ , where  $b = r_{\text{surface}}$ ” (as said in SunQM-3.update-4). In this case, for a Sun mass ball’s Schrodinger equation’s solution (i.e., the wave function), its r-1D quantum number n is still from 1 to  $\infty$ , although the r-1D space from  $r_{\text{surface}}$  to  $r_{\text{infinity}}$  is represented by  $r_{\text{surface}} + r_{\text{infinity}} = r_{\text{surface}} + \Delta r$ , and  $\Delta r$  is forced to be  $\rightarrow 0$ .

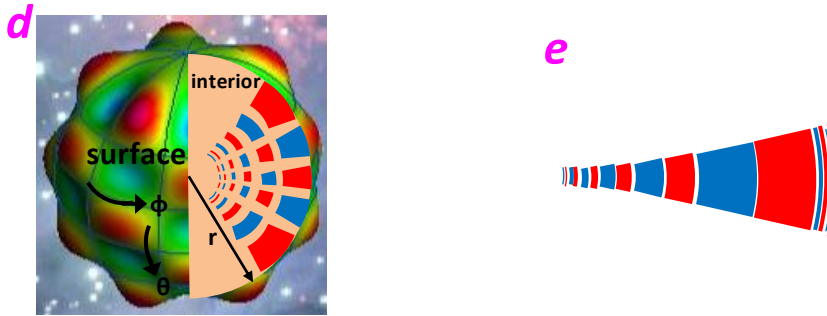


Figure (SunQM-6s9’s Fig-2d), and the newly added Figure (SunQM-6s9’s Fig-2e).

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[34] SunQM-6s10: {N,n} QM Field Theory, S/RFs-force, Nuclear Force, Spin-spin Interaction, and the Possible Origin of the Weak-Force and Beta-Decay. <https://vixra.org/pdf/2406.0140v1.pdf> (submitted on 2024-06-24)

### SunQM-6s10.update-1

This should go into Appendix-F, as item-5: as shown in SunQM-3s4, using the Earth-sized core as the  $p\{0,1/q\}$  size, “All major rings of gas/ice planet are at  $\Delta n = +1$  out of planet’s surface (if using their Earth-sized core as  $r_1$ ). For Neptune and Uranus, both of their surfaces are at  $p\text{Core}\{0,2//2\}$  size, and their major rings are at  $p\text{Core}\{0,3//2\}$  orbit. For Saturn and Jupiter, both of their surfaces are at around  $p\text{Core}\{0,3//3\}$  size, and their major rings are at  $p\text{Core}\{0,4//3\}$  orbit”. The resulted most stable orbits for the artificial Earth satellites at  $r = 4r_{\text{Earth}}$  also matches that “All major rings of gas/ice planet are at  $\Delta n = +1$  out of planet’s surface (if using their Earth-sized core as  $r_1$ )”. Therefore, now we need to extend the “gas/ice planet” as the “gas/ice/terrestrial planet”.

### SunQM-6s10.update-2

Change to: “by comparing  $Y(l=1,m=+1) = -\sqrt{\frac{3}{8\pi}} e^{i\varphi} \sin \theta$ , with,  $Y(l=1,m=-1) = \sqrt{\frac{3}{8\pi}} e^{-i\varphi} \sin \theta$ , ”.

### SunQM-6s10.update-3

“I predict that we should be able to find the 3-body (or N-body) orbital motion in the “face-to-face plus face-opposite-face two-level orbital motion” **mode** in the macro-world (like that three nucleons inside a  ${}^3\text{He}$ , but with three celestial fragments, or three stars, or three galaxies, or even three galaxy clusters, etc.)”. use “**mode**”, not “model”.

### SunQM-6s10.update-4

Appendix A modified to:

All inversed RF-forces, including the inversed RFe-force (i.e., one kind of magnetic force), the inversed RFg-force (i.e., one kind of dark-matter force), and the inversed RFs-force (i.e., one kind of Weak force), are in the quasi-r-1D space and in the “quasi” nL0 mode (that may produce neither the bound states nor the binding energy)

According to wiki “Weak interaction”: “*The weak interaction does not produce bound states nor does it involve binding energy – something that gravity does on an astronomical scale, that the electromagnetic force does at the atomic level, and that the strong nuclear force does inside nuclei*”. In SunQM-6, I showed that in the steady state, the RFe-force is in 100% RF (besides in nLL mode), so it does not show any magnetic force (or the magnetic  $\vec{B}$  field strength equals to zero, or  $\vec{B}$  vector =0). Only when a positive charge is in translation or spinning, then its primary E-force gains translational velocity  $\vec{v}$  or spin speed  $\vec{s}$ , and then its primary E-force’s orthogonal companion RFe-force decreases its RF from 100% to less than 100%, and become either the  $\phi$ -1D “circular RFe-force” (under the translation motion, in nLL mode), or the “inversed RFe-force” (under the spin motion, in the “quasi nL0 mode”, and in a “quasi-r-1D space”). Obviously, the  $\phi$ -1D circular RFe-force (as one kind of magnetic force) may produce neither the bound states nor the binding energy (because its force line is a sealed line inside a circle). This result can be extended to the  $\phi$ -1D circular RFg-force (i.e., one kind of dark-matter force), and to the  $\phi$ -1D circular RFs-force (i.e., one kind of weak force), and they may produce neither the bound states nor the binding energy.

For the “inversed RFe-force” (as the second kind of magnetic force), it is in the “quasi nL0 mode”, it too may produce neither the bound states nor the binding energy (because its force line is still a sealed line in a “quasi-r-1D space”). In contrast, all the true nL0 mode force (the E-force, G-force, and S-force) do produce the bound states and the binding energy (because their force lines are the open force lines (no end, not sealed)). So, this “inversed RFe-force” is not in a “true” nL0 mode. This result can also be expanded as: all inversed RF-forces (including RFe-force (i.e., a second kind of magnetic force), RFg-force (i.e., a second kind of dark-matter force), and RFs-force (i.e., a second kind of Weak force)) are in the “quasi nL0 mode” and in a “quasi-r-1D space” (that may produce neither the bound states nor the binding energy).

#### SunQM-6s10.update-5

In the “face-opposite-face locked binary orbital motion” (in  $\phi$ -1D bi-direction with the anti-parallel spin), the “reduced mass center”, means the “whole period time-averaged orbital-motion reduced mass center” and it may equal to the (fixed, or time independent) 3D position of the “reduced mass center” when these two mass bodies are separated at the largest distance in between (in the  $\phi$ -1D orbit in xy-plane). For example, for one “u-d” binary and one “d” singlet (i.e., three quarks in a neutron) that is doing the (virtual) “face-opposite-face locked binary orbital motion”, the “whole period time-averaged orbital-motion reduced mass center” is at a (fixed, or time independent) virtual 3D position when these two mass bodies (one “u-d” binary and one “d” singlet) are separated at the largest distance in between (in the  $\phi$ -1D orbit in xy-plane). Notice this “whole period time-averaged orbital-motion reduced mass center” (in the “face-opposite-face locked binary orbital motion”) also equals to the real “reduced mass center” of the two same mass bodies (one “u-d” binary and one “d” singlet) that is doing the real  $\theta$ -1D orbital uni-directional motion (that is transformed from the “face-opposite-face locked binary orbital motion” in  $\phi$ -1D bi-direction).

#### SunQM-6s10.update-6

Moved to SunQM-6s12.

#### SunQM-6s10.update-7

The title of the section-I is changed to be: “An idealized single point-centered S/RFs-force field (from a single quark) is guessed to be the same as that of the single point-centered E/RFe-force field (and the G/RFg-force field)”.

See SunQM-6s12 for a possible reason that why S-force becomes a short-distance force.

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[35] **SunQM-7s1: Space Formation/Transformation, Relativity, and the Possible Origin of the Lightspeed and Its Constancy (Viewed From the {N,n} QM).** <https://vixra.org/pdf/2407.0170v1.pdf> (submitted on 2024-07-29)

#### SunQM-7s1.update-1

In Fig-1(b, c, d, e, i, j, k), notice that the red curve represents  $n=1$  wave function (with only one positive peak), the blue curve represents  $n=2$  wave function (with only one positive peak and one negative peak), and the green curve represents  $n=3$  wave function (with only two positive peaks and one negative peak).

#### SunQM-7s1.update-2

In section-I-f, add:

Because it is in full RF, the  $n=1$  electron's motion in a H-atom can be said that it is practically in a  $\theta\phi$ -2D space, although it does have some minor  $r$ -1D motion. Similarly, we may can say that, although our universe is a spherical  $r\theta\phi$ -3D space (on the surface of a  $r'r\theta\phi$ -4D ball something), it also slightly extrude (or intrude) into the 4<sup>th</sup> dimension (i.e., the  $r'$ -1D), and the best place that we can see this 4<sup>th</sup>-dimension intruding phenomenon (from our 3D space) is the black hole effect (that near or on the surface of a black hole).

Also, section I-g said "*Larger size 3D space may allow the higher dimension (i.e., the effective 4D space) to exist, while the smaller size 3D space may only allow the lower dimension (i.e., the effective 2D space) to exist*". See SunQM-6s12 for an alternative reason.

This analysis may also reveal that in QM, not only many different QM states are superpositioned, but also the 4D, 3D, 2D spaces are most likely superpositioned.

#### SunQM-7s1.update-3

Add:

I-i. Dynamic space transformation (part-5):

As explained in SunMQ-7s2's Appendix-B, in an H-atom, if the  $n = 1$  electron is fixed at  $r = r_1$  and  $\theta = \pi/2$ , then after the electron is released to free, it will carry  $E_\phi = \frac{1}{2}m\overline{v_\phi}^2$  as the free electron's kinetic energy. For the  $E = mc^2$ , it uses the sum of  $E_\theta = \frac{1}{2}m\overline{v_\theta}^2$  and  $E_r = \frac{1}{2}m\overline{v_r}^2$ . So, in this case, the original micro- $\phi$ -1D energy  $E_\phi = \frac{1}{2}m\overline{v_\phi}^2$  is dimensional-transformed to be the macro- $r$ -1D energy (with  $E_r = \frac{1}{2}m\overline{v_r}^2$  equivalent). Also, the micro- $\theta$ -1D energy  $E_\theta = \frac{1}{2}m\overline{v_\theta}^2$  is dimensional-transformed to be the macro- $r$ -1D energy of (half of)  $E = mc^2$ . Thus, we may can say, for an energy 3D space, both the micro- $\phi$ -1D energy space dimension and the micro- $\theta$ -1D energy space dimension are transformed to be a macro- $r$ -1D energy space dimension.

#### SunQM-7s1.update-4

Add:

I-j. Dynamic space transformation (part-6):

In SunQM-7's Fig-6c, it illustrated "*A "rhodopsin-type" steady state universe with cycles of a mega-"photon" absorption (that causes a minor expanding of universe) and a mega-"black hole" release (that causes a minor contracting of universe)*". This process may also can be mimicked by a H-atom's  $n = 2$  electron (and associated space) transiting to  $n = 3$  electron (and associated space) after absorbed a 656.1 nm photon, and/or vice versa.

#### SunQM-7s1.update-5

The title of section-I-g is changed to "Dynamic space transformation (part-4): Larger size 3D space may allow the higher dimension (i.e., the effective 4D space) **to be effective**, while the smaller size 3D space may only allow the lower dimension (i.e., the effective 2D space) **to be effective**".

#### SunQM-7s1.update-6

Add:

I-k. Dynamic space transformation (part-7):

SunQM-8's Fig-7b showed that, when a straight-line-1D space (in SunQM-8's Fig-7a) is rotated and twisted (only at the center of  $n=0$ , but not at the  $n \gg 0$  ends), it becomes a spiral-line-1D space, and its 1D  $\{N, n/q\}$  QM structure is changed from SunQM-8's Fig-7a to SunQM-8's Fig-7b.

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**[36] SunQM-7s2: The Possible Origins of the Relativistic Length Contraction,  $E=mc^2$ , and to Fuse the General Relativity's Radial Contraction with the Non-Linear  $\{N, n\}$  QM.** <https://vixra.org/pdf/2408.0050v1.pdf> (submitted on 2024-08-12).

### SunQM-7s2.update-1

In SunQM-7s2's Appendix-A, I need to point out that because Bohr's formula  $r_n = r_1 n^2$  and the (free-fall) accelerated distance formula  $d = \frac{1}{2} g t^2$  may have the same origin (see SunQM-7's section VII), and the  $q$  (in the  $\{N, n/q\}$  QM) is related (or even equivalent) to the  $n$ , so the  $q$  (or  $n$ ) and  $t$  are equivalent in above two formulas. Therefore, the time dilation  $\Delta t = \frac{\Delta t_0}{\sqrt{1-v_x^2/c^2}}$  (SunQM-7s2's eq-27) in the special (and general) relativity and the  $q$  dilation  $q' = \frac{q}{\sqrt{1-\frac{v_r^2}{c^2}}}$  (SunQM-7s2's eq-25) are equivalent.

### SunQM-7s2.update-2

In SunQM-7s2's Appendix-B, I said: "*Under the zero external force, the electron orbit (in an H-atom) become RF. Thus  $\theta$ -1D is not locked to  $\theta = \pi/2$ , only  $r$ -1D is locked to  $r = r_n$ . In this way, the proton-electron system may have lowered its system energy. Therefore, the proton-electron system wants to have its electron orbit in RF. ... my best guess is that the RF electron will not be released. It may only can be released when the RF electron obtained extra energy of  $E_\theta = \frac{1}{2} m \overline{v_\theta^2}$  and be fixed to  $\theta = \pi/2$ , then it can fly away*". This means that lowering dimension (that is, an energy space transformation from  $\theta\phi$ -2D without RF to  $\theta\phi$ -2D with RF that may equivalent to  $\theta\phi$ -1D) may decrease the "global energy" state for the system, and thus make the system become more stable. The similar situation may happen in the nucleon structure, in which three quarks'  $r\theta\phi$ -3D motion transformed to be a  $\theta\phi$ -2D motion (that equivalent to a  $r\phi$ -2D motion), and thus decrease the "global energy" state for the system, and thus make the single quark un-extractable.

### SunQM-7s2.update-3

In SunQM-7s2's section II, I said: "*On a BH surface,  $r\theta\phi$ -3D space may be degenerated into 1D space (for the velocity), and this 1D space can be treated as either a  $r$ -1D space or a  $\phi$ -1D space (as you like)*". SunQM-7s1 used "space density" to describe the curvature of the space near by a black hole: *the higher the curvature, the denser the space will be*. Combining these two, can we say that the higher the "space density" (or the higher curvature of the space), the lower the effective dimension it will have? It is interesting to compare this saying to another saying (in SunQM-7s1's section-I-g): "*Dynamic space transformation (part-4): Larger size 3D space may allow the higher dimension (i.e., the effective 4D space) to exist, while the smaller size 3D space may only allow the lower dimension (i.e., the effective 2D space) to exist*".

### SunQM-7s2.update-4

In the (last step of) x-ray protein crystal 3D structure determination, the 3D model of the protein structure need to be "heated" to "high temperature" (to force all atoms to deviate from the initial model's 3D position), and then slowly "cool down" for the global binding-energy minimization.

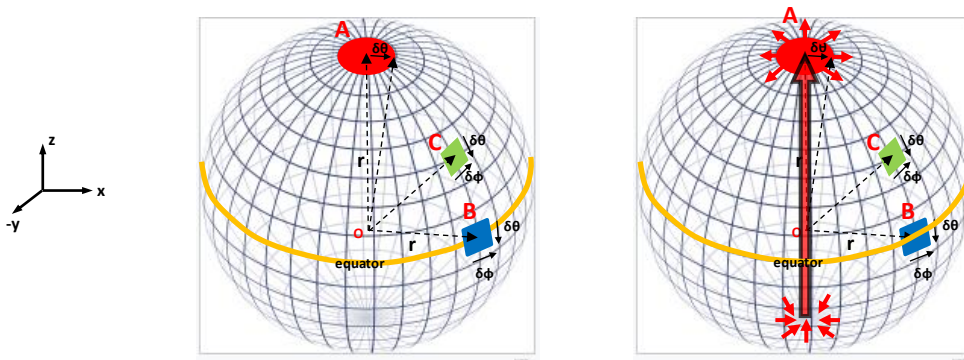
Several times in this paper, to explain  $\Delta E = \Delta m c^2$ , I used the fuzzy formulas like eq-23 ( $\frac{1}{2} m \overline{v_r^2} = \frac{1}{2} kT$ ,  $m \overline{v_{\theta\phi}^2} = kT$ ), or  $\Delta m \overline{v_{\theta\phi}^2} = \Delta m c^2$ , etc. The expressions of  $\overline{v^2} = \overline{v_r^2} + \overline{v_\theta^2} + \overline{v_\phi^2}$  and  $\overline{v_r^2} = \overline{v_\theta^2} = \overline{v_\phi^2}$ , etc., are originally from the (micro thermal) statistics, and now I tried to use them for analyzing the orbital dynamics in the macro-world. Although

strictly to say this kind of usage is not correct, but, with the hint that “to fuzzy the 3D-position of all atoms for the purpose of minimizing the global energy”, I hope that the fuzzing of (micro thermal) statistics with macro-orbital dynamics may will also help us to give a “global energy minimum” kind of explanation for the  $\Delta E = \Delta m c^2$ .

Through this analysis, I guessed that the “fuzzing” process, or the “heating-up the thermal motion” process, may be a standard method for the preparation of the “global energy minimization” process. The “global energy minimization” emphasis more on the completeness over the self-consistency. The “fuzzing” process (or the “heating-up the thermal motion” process) is to sacrifice some (initial) self-consistency to gain the higher completeness. (This is my citizen-scientist-levelled guess).

**SunQM-7s2.update-5**

Fig-4 change to: Point-A (after adding the field lines from south pole to north pole passing through inside the ball) equals to the primary (E-, G-) force, while the point-B equals to the (RFe- RFG-) force. Notice that the point-A’s field-lines are not only from the point-A radiate to all  $2\pi$  directions (in the  $\theta\phi$ -2D space), but also including from the origin-O to the point-A along the +z axis (in the r-1D space, or from the south-pole to the north-pole).



**SunQM-7s2.update-6**

In 4D, try the 4<sup>th</sup> dimension  $r' = ct$ , same as Einstein’s 4D-spacetime?

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[37] SunQM-6s11: In {N,n} QM Field Theory, the Residue nLL State Caused Positive Precession May Be the Origin of Mercury’s Perihelion Precession, the Sunspot Drift, the Elliptic/Parabolic/Hyperbolic Orbits (Including the Gravitational Lensing), etc. <https://vixra.org/pdf/2502.0030v1.pdf>. Submitted to viXra.org on 2/6/2025.

**SunQM-6s11.update-1**

In section-VI, add the yellow high-lighted words: “the {N,n} QM research made me to believe that, the GR, the QCD, the string theory, the {N,n} QM, the Newtonian mechanics, the Hamiltonian/Lagrangian mechanics, the electrodynamics, the statistic mechanics, ..., they are the different “faces” of the same “Master Mechanics”.”.

**SunQM-6s11.update-2**

In SunQM-6s10, I proposed the “face-to-face plus face-opposite-face two-level orbital motion” model for a pair of (up-spin and down-spin) electrons in an He-atom, or the four nucleons in a <sup>4</sup>He nucleus, etc. I also mentioned that “we should be able to find the 3-body (or N-body) orbital motion in the “face-to-face plus face-opposite-face two-level orbital motion” mode in the macro-world (like that ... three stars, or three galaxies, or even three galaxy clusters, etc.)”.

In SunQM-6s11, I said: “From them (eq-9a and eq-9b), I guessed that these two waves (or wave functions, or NBPs, both in nLL QM state) with  $m = \pm 2$  should be doing orbital rotation in  $\phi$ -1D in the opposite directions (meaning,

*simultaneously one in  $+\varphi$  direction and another one in  $-\varphi$  direction). However, at first, I did not fully understand how this works in a real physical world in the particle view (although I did understand the standing wave view (for matter wave's phase wave) )”.*

Now I realized that in the macro-world, we may be able to use this to explain some details of the tectonic drift (or continental drift).

- 1) The opening of the north Atlantic Ocean separation (i.e., the Eurasia continent and Africa continent moving eastward, while the North America continent relatively “moving” westward) may can be explained as the (macro-world's example of) Earth equator mantle surface matter (in nLL QM state) is doing simultaneous  $\pm\varphi$  bi-directional orbital motion (in  $\varphi$ -1D).
- 2) The Antarctic continent drift in  $\theta$ -1D (during the last 300 My) from about  $60^\circ$  South to  $90^\circ$  South latitude may partly can be explained as the (macro-world's example of) Earth equator surface mantle matter is doing  $\theta$ -1D motion (due to the “face-to-face plus face-opposite-face two-level orbital motion” mode).
- 3) The residue nLL QM state (faster eastward-flow) stream that oozed out at Earth equator mantle surface, and that moving towards to the two poles of Earth, may can be explained as the (macro-world's example of) Earth equator mantle surface matter (in nLL QM state) is doing simultaneous  $\pm\varphi$  bi-directional orbital motion (in  $\varphi$ -1D) but then is transformed to be in the  $\pm\theta$  bi-directional motion (due to the “face-to-face plus face-opposite-face two-level orbital motion” mode). Notice that it is similar to SunQM-6s11's Fig-8, rather than SunQM-6s11's Fig-5b.

#### SunQM-6s11.update-3

Change section I-d title to: “I-d. In eq-6 and eq-7, to determine the quantum numbers of  $|m|$  and  $n'$  at the (major) residue nLL QM state (that caused positive precession) for Mercury (and Venus, Earth, Mars)'s perihelion procession”.

#### SunQM-6s11.update-4

Change Appendix-B-3 to: “The ABCBA cycle that used to describe the photon propagation process (in SunQM-6s5) may be also one kind of  $Y/m$  cycle”.

#### SunQM-6s11.update-5

On Earth's surface (that is a spherical 2D space on the surface of a (self-spinning) 3D ball something), governed by the Coriolis force, the northern hemisphere's cyclone is always anti-clockwise, while the southern hemisphere's cyclone is always clockwise. If our universe is the spherical 3D space on the surface of a (self-spinning) 4D ball something, will it cause that in some region of our universe it always produces the right-hand G/RFG-force pair (or the right-hand E/RFE-force pair, as shown in SunQM-6's Fig-1a, or Fig-2a), while in some other region of our universe it always produced the left-hand G/RFG-force pair (or the left-hand E/RFE-force pair)? Or, will it cause that in some region of our universe it has the residue nLL QM state as the faster-flow (than surroundings, see SunQM-6s11) for the one period of time, then it has the residue nLL QM state as the slower-flow (than surroundings) for another period of time?

#### SunQM-6s11.update-6

In SunQM-3s11 (and in SunQM-4), I only generated a circular orbit for Earth (and for all other planets), with the real planet body size. Now, we can use SunQM-6s11's result to add not only the elliptical orbit property to Earth (and to all other planets)'s orbit, but also the procession property of this elliptical orbit.

#### SunQM-6s11.update-7

In SunQM-4s2's Fig-12 and Fig-13 (e, f, g), the oscillation of the El Nino and the La Nina (along the equator of the Earth on the Pacific Ocean between  $120^\circ\text{E}$  and  $80^\circ\text{W}$ ) can also be explained as the positive/negative procession cycle (or the “ $Y/m$  cycle”).

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[38] SunQM-8: {N,n} QM For the Condensed Matter Structure and/or the Bio-QM Structure (That Formed Under Either the Residue E-Force or the Residue G-Force). <https://vixra.org/pdf/2602.0107v1.pdf>. Submitted to viXra.org on 2/20/2026.

**SunQM-8.update-1**

In Table-5, add columns 12~14, for searching the “primary force strength density” per “ball surface area”. Result: No convergent result was found. So, only found the convergent result as “primary force strength density” =  $F \times r$  (in the column 6).

	strength*	action space	{N,n/6} size	r = meter	F X r	F / r	volume m^3	F X Vol *m^3	F / Vol 1/m^3	r value obtained from	Ball Surface Area m^2	F X Area *m^2	F / Area 1/m^2
<b>G-force</b>	1E-38	Solar System	{5,1/6}	8.32E+15	8.32E-23	1.20E-54	2.41E+48	2.41E+10	4.15E-87	SunQM-5, Tab-1, cold-r	8.70E+32	8.70E-06	1.15E-71
	1E-38	Milky Way galaxy	{8,1/6}	3.88E+20	3.88E-18	2.58E-59	2.45E+62	2.45E+24	4.09E-101		1.89E+42	1.89E+04	5.29E-81
	1E-38	Virgo Super Cluster	{10,1/6}	5.03E+23	5.03E-15	1.99E-62	5.33E+71	5.33E+33	1.88E-110		3.18E+48	3.18E+10	3.15E-87
	1E-38	Giant GRB Ring, The Giant Arc**	{11,1/6}	1.81E+25	1.81E-13	5.52E-64	2.49E+76	2.49E+38	4.02E-115		4.12E+51	4.12E+13	2.43E-90
	1E-38	observable universe^	{12,1/6}	6.52E+26	6.52E-12	1.53E-65	1.16E+81	1.16E+43	8.62E-120		5.34E+54	5.34E+16	1.87E-93
	1E-38		{13,1/6}	2.35E+28	2.35E-10	4.26E-67	5.41E+85	5.41E+47	1.85E-124		6.92E+57	6.92E+19	1.44E-96
	1E-38		{14,1/6}	8.45E+29	8.45E-09	1.18E-68	2.53E+90	2.53E+52	3.96E-129		8.97E+60	8.97E+22	1.11E-99
	1E-38		{15,1/6}	3.04E+31	3.04E-07	3.29E-70	1.18E+95	1.18E+57	8.49E-134		1.16E+64	1.16E+26	8.60E-103
	1E-38		{20,1/6}	1.84E+39	1.84E+01	5.44E-78	2.61E+118	2.61E+80	3.84E-157		4.25E+79	4.25E+41	2.35E-118
	<b>E-force</b>	0.01	proton size	{-15,1/6}	1.13E-15	1.13E-17	8.82E+12	6.11E-45	6.11E-47	1.64E+42		1.62E-29	1.62E-31
0.01			{-14,1/6}	4.08E-14	4.08E-16	2.45E+11	2.85E-40	2.85E-42	3.51E+37		2.09E-26	2.09E-28	4.78E+23
0.01			{-13,1/6}	1.47E-12	1.47E-14	6.81E+09	1.33E-35	1.33E-37	7.52E+32		2.71E-23	2.71E-25	3.69E+20
0.01		H-atom n=1 electron r	{-12,1/6}	5.29E-11	5.29E-13	1.89E+08	6.20E-31	6.20E-33	1.61E+28	SunQM-5, Tab-1, electron-r	3.52E-20	3.52E-22	2.84E+17
0.01		H-atom n=6 electron r	{-11,1/6}	1.90E-09	1.90E-11	5.25E+06	2.89E-26	2.89E-28	3.46E+23		4.56E-17	4.56E-19	2.19E+14
0.01		theory, max atom	{-10,1/6}	6.86E-08	6.86E-10	1.46E+05	1.35E-21	1.35E-23	7.41E+18		5.91E-14	5.91E-16	1.69E+11
<b>S-force</b>	1	quark size	{-17,1/6}	6.48E-19	6.48E-19	1.54E+18	1.14E-54	1.14E-54	8.77E+53		5.28E-36	5.28E-36	1.89E+35
	1		{-16,1/6}	2.33E-17	2.33E-17	4.29E+16	5.32E-50	5.32E-50	1.88E+49		6.84E-33	6.84E-33	1.46E+32
	1	proton size	{-15,1/6}	8.40E-16	8.40E-16	1.19E+15	2.48E-45	2.48E-45	4.03E+44	SunQM-5, Tab-1, proton-r	8.87E-30	8.87E-30	1.13E+29
	1		{-14,1/6}	3.02E-14	3.02E-14	3.31E+13	1.16E-40	1.16E-40	8.63E+39		1.15E-26	1.15E-26	8.70E+25
	1		{-13,1/6}	1.09E-12	1.09E-12	9.19E+11	5.40E-36	5.40E-36	1.85E+35		1.49E-23	1.49E-23	6.71E+22
	1	theory, max nucleus	{-12,1/6}	3.92E-11	3.92E-11	2.55E+10	2.52E-31	2.52E-31	3.97E+30		1.93E-20	1.93E-20	5.18E+19
Weak-force	1.E-06												

**SunQM-8.update-2**

From SunQM-8’s Fig-2, Fig-4, and Table-3, we can see that, when using {N,n/q} QM to describe a Solar system, or a crystal lattice, or a human body, the description become more and more complicated. This may reveal that the physics of a human body is more complicated than that of a crystal lattice, and the physics of a crystal lattice is more complicated than that of a star-planet system.

**SunQM-8.update-3**

When you read SunQM-8’s Fig-5a vs. Fig-5b (the re-distribution of the force-lines) carefully, you may will better understand that why I want to find out the “primary force strength density” (in SunQM-8’s section-VII), and why “primary force strength density” equals to  $F \times r$ .

Remember that the calculation of  $F \times r$  is the same (or equals to) the calculation of the potential energy. If we can use Table-5 to determine the size of our universe, then in the gravitational potential energy formula “ $V = GM/r + \text{constant}$ ”, the “constant” is no longer a random value, it must be a fixed value (that is anchored by the size of our universe). This should be also true for the electric potential energy.

**SunQM-8.update-4**

Not only the electromagnetic field has the difference between the near field versus the far field (as the textbook taught us), here I hypothesized that a pair of +/- static electric fields may also has the difference between the near field versus the far field. A pair of point-centered +/- static electric field’s near field is dominated by the two primary E-force field (with its force-lines radiated isotopically in all  $4\pi$  direction in  $r\theta\phi$ -3D space, as illustrated in the red-shade area or the blue-shade area in the Figure “SunQM-8.update-4”). The same pair of +/- static electric field’s far field may be dominated by the residue E-force field (with its force-lines re-distributed and concentrated in the +x and -x two (straight-line) 1D-spaces (to something like  $F_e \rightarrow 1/r$ , as illustrated in the Figure “SunQM-8.update-4”), and with its force-lines redistributed away from the yz-plane

(to something like  $F_e \rightarrow 1/r^x$ , with  $x \gg 2$ , or  $F_e \rightarrow 0$ , in yz-plane)). This near-field versus far-field may be also true for the force fields of a pair of the point-centered primary G-forces and their residue G-force fields.

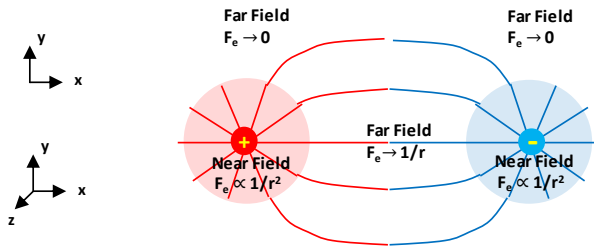


Figure “SunQM-8.update-4”.

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[39] SunQM-9s1: Updates and Corrections for the SunQM Series Articles (Part-1).

<https://vixra.org/pdf/2503.0146v1.pdf> (submitted on 202503-24).

SunQM-9s1.update-1

Page-1, “6s8, 6s10, 6s10, 6s11 ...” change to “6s8, 6s10, 6s9, 6s11 ...”

SunQM-9s1.update-2

- 1) 400k -> 200k words;
- 2) Change “pseudo” to “quasi”;
- 3) SunQM-2 change according to SunQM-6s7;
- 4) SunQM-4 change according to SunQM-6s7.

SunQM-1.update-8

“So Earth (or Neptune, or Uranus) ’s  $p\{N,n\}o$  is a true base-1 number (see wiki “Unary numeral system”, base-1, 1,2,3,4, = 1, 11, 111, 1111)” changed to “So Earth (or Neptune, or Uranus) ’s  $p\{N,n/2\}o$  is a kind of base-1 number (see wiki “Unary numeral system”, base-1, 1,2,3,4, = 1, 11, 111, 1111)”.

SunQM-1.update-9

This is one of my major achievements (in the  $\{N,n//q\}$  QM research): A brand new  $\{N,n//q\}$  number system was discovered (that based on the discovery of the Solar system’s  $\{N,n//6\}$  QM structure). Our universe (as a whole) can be described by this  $\{N,n//6\}$  number system. This should be a break-through achievement in the arithmetical field. It equivalent to a mathematical finding of a new unary (or binary) number system, and a new logarithm method, and a new natural constant (or, Euler’s number) “e”, and add them together.

Furthermore, the Solar  $\{N,n//6\}$  QM revealed that, (arithmetically) one of the several basic characters of integer number is the quantum, and only small integer numbers (like 1, 2, 3, 4, 5, 6, etc.) show the strong quantum character, the large integer numbers (like 10000, 10001, 10002, etc.) show the weak (or nearly zero) quantum character. For the large integer number x, only 1x, 2x, 3x, ... , may show the strong quantum character. In a physical world (if it can be described as the large integer numbers), correctly choose the unit (as the x) is the key to show its quantum character.

Even more, the Solar  $\{N,n//6\}$  QM revealed that, at the largest scale, our Solar system (and our universe) should be described quantumly. Or, quantum mechanics is the simplest and easiest way to describe our universe (and our Solar system).

SunQM-1.update-10

Table 3 need to be replaced by:

Table with columns for NASA's data of planets, assigned N, n, q-factor, set total n=1 at Sun core size (0,1//6), and set total n=1 at black hole size (-3,1//6). Rows include various celestial bodies like Sun core, SUN, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, and White Dwarf.

SunQM-2.update-5

SunQM-6s7 showed that the QM textbook's v\_n,ph = 1/2 v\_n,gr may be incorrect, my deduction result v\_n,ph = n/2 v\_n,gr should be more correct. Based on SunQM-6s7's eq-1 through eq-25, SunQM-2's Table-1 is re-calculated as:

Table with columns for NASA's data of planets, classical QM, and wave set (0,1//6), (1,1//6), and (2,1//6). It contains detailed numerical data for various celestial bodies and their properties.

Notice that now Earth's orbit has a fixed lambda\_n,ph = 2 pi r\_n (see SunQM-6s7's eq-9) for any high-frequency n'.

SunQM-3s3.update-6

In SunQM-3s3's Fig-3 and Fig-4, Jupiter surface's  $|5,4,3\rangle$ ,  $|5,4,3\rangle$ ,  $|5,4,1\rangle$  bands can be combined and treated as  $|3,2,1\rangle$  QM state (while Jupiter's  $|5,4,4\rangle$  band can be re-named as the  $|3,2,2\rangle$  band), so that Jupiter surface's  $|5,4,m\rangle$  QM state can be approximated to be the  $|3,2,m\rangle$  QM state. So, Jupiter surface has a superposition QM states of  $n=5$  and  $n=3$ .

**SunQM-3s4.update-5**

From wiki "Rings of Saturn", all rings lie in Saturn's equatorial plane, except Phoebe-ring, which "lies in the plane of Saturn's orbit, or roughly the ecliptic, and thus is tilted 27 degrees from Saturn's equatorial plane and the other rings". I mentioned, "The Phoebe-ring in the  $pSurface\{3,1/2\}$  orbit space (starts at  $pSurface\{3,1/2\}$ , and ends at  $pSurface\{4,1/2\}$ ), but it is retrograde and out of Saturn's equatorial plane", and, "Because the released Phoebe moon surface's (retrograde) mass was caused by the hitting of the Saturn's vaporized and excited prograde mass, so its retrograde speed was slowed, therefore it had to fly inward to pick up the speed, so the Phoebe ring's radius is smaller than Phoebe moon orbit's radius". This explanation showed that, the Phoebe ring orbital-r is clearly a quantum effect, because if no quantum effect, the inward-flying matter formed Phoebe ring will have the smeared orbital-r from the Phoebe moon's orbital-r to the Saturn surface.

Similarly, the empty rings in the Asteroid belt (in between 2.0 AU to 3.4 AU, see in SunQM-1s1's Fig-5) is also caused by the quantum orbital effect.

These quantumly distributed orbits clearly showed that celestial orbits follow the quantum mechanics.

**SunQM-3s6.update-3, and, SunQM-3s6.update-4**

Add "(several years ago)" to: "However, for time-killing, (several years ago) I often read ...".

**SunQM-4.update-5**

SunQM-6s7 showed that the QM textbook's  $v_{n,ph} = \frac{1}{2} v_{n,gr}$  may be incorrect, my deduction result  $v_{n,ph} = \frac{n}{2} v_{n,gr}$  should be correct. Based on SunQM-6s7's eq-1 through eq-25, SunQM-4's eq-35 through eq-40 are re-written as:

$$v_{n,ph} = \frac{n}{2} v_{n,gr} \tag{eq-35}$$

$$v_{classical} = v_n = v_{n,gr} = v_{gr} = \frac{2}{n} v_{ph} = \frac{2}{n} v_{n,ph} \tag{eq-36}$$

$$v_{n,ph} = \lambda_{n,ph} f_{n,ph} \tag{eq-37 (also see SunQM-6s7-eq-10)}$$

$$\omega_{n,ph} = 2\pi f_{n,ph} = \left(\frac{n}{2}\right) \frac{v_{n,gr}}{r_n} = \frac{v_{n,ph}}{r_n} \tag{eq-38}$$

$$\omega_n = \omega_{n,gr} = \frac{v_{n,gr}}{r_n} = \frac{v_n}{r_n} \tag{eq-39 (also see SunQM-6s7-eq-16)}$$

$$\omega_{n,ph} = 2\pi f_{n,ph} = \left(\frac{n}{2}\right) \frac{v_{n,gr}}{r_n} = \left(\frac{n}{2}\right) \omega_{n,gr} = \left(\frac{n}{2}\right) \omega_{n,gr} \tag{eq-40}$$

**SunQM-5.update-7**

Remove (the greyed out part):

Furthermore, this analysis showed us several true examples that the quantum number  $q$  can be in values of 7 (the  $\{N,n/7\}$  QM structure of nuclides at high  $Z\#$ ), 6 (the standard  $\{N,n/6\}$  QM structure from  $N = -17$  to  $N = 10$ ), 5 (Jupiter's internal and surface  $p\{N,n/5\}$  QM structure), 4 (equivalent to  $\{N,n/2\}$  QM naturally), 3 (Saturn's internal and outer ring  $p\{N,n/3\}$  QM structure, and Jupiter's outer ring  $p\{N,n/3\}$  QM structure), 2 (the initial  $p\{N,n/2\}$  QM structure for all original planets, the current Neptune's  $p\{N,n/2\}$  QM structure), 1 (Earth's initial  $p\{N,n/2\}$  QM structure is now become  $p\{N,n/2/2\} \rightarrow p\{N,n/4\}$  QM structure with  $q = 2 * 1/2 = 1$ , after stripping off  $24/25 = 96\%$  of mass). So far, we have not seen any obstacle for  $q$  quantum number to take the even higher values of 8, 9, etc., or the even lower values of  $2 * 1/2 * 1/2 = 1/2$ , or even  $2 * 1/2 * 1/2 * 1/2 = 1/4$ , etc.

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## Questions and Answers:

**1) Question:** (From: Jason, ...@gmail.com, 12/11/2018), may I know that why you would consider using quantum mechanics to study large scale objects? How is it better than classical mechanics?

**Answer:**

The answer has been shown in my articles. For macro-world, classical mechanism (CM) only gives the bottom-up view, while quantum mechanics (QM) may give both top-down and bottom-up view (see my paper SunQM-2). For example, Solar {N,n} QM model predicts four undiscovered planets/belts in between Kuiper belt and Oort cloud, while the classical mechanism still have hard time to predict the 9th planet.

The advantage of CM is that it can give the true dynamics, while the traditional (Born-probability-based) QM can only give a series of states and the probability of transition between states. However, in theory, the new NBP (non-Born- probability) -based QM should also give the true dynamics, although as a citizen scientist, currently I don't have the ability to do it.

**2) Question:** (From Yang, ...@hotmail.com, 6/4/2019), here I translate his question (in Chinese) as: "Using QM to study the Solar system is unlikely to be correct, because the wave function is a complex number, ...".

**Answer:**

In SunQM-2, I pointed out (by guessing) that: "Actually the "i\*h" may be the true unit of quantum action of RF rotation. I believe that the complex number sign "i" of "ih" in equations (or operators) reflects the real-time RF movement. For example: uncertainty principle  $[L_x, L_y] = i\hbar L_z$ ,  $[x^\wedge, p^\wedge] = i\hbar$ ,  $p^\wedge = -i\hbar \nabla$ ,  $E^\wedge = i\hbar \partial/\partial t$  ...". In SunQM-4, I explained that: "Because of the rotation diffusion (or RotaFusion, or RF) in  $\theta\phi$ -2D-dimension, the two functions of  $\Psi$  in  $\theta$ - and  $\phi$ -dimensions are usually grouped together as spherical harmonics:  $\Theta(\theta) \Phi(\phi) = Y(L,m)$ ". Because Schrodinger equation's solution produced wave function has the complex number only in the  $\Phi(\phi)$  of the  $Y(L,m)$ , not in the  $R(r)$ , it may mean that the  $\phi$  variable in the function of  $\Phi(\phi)$  is varying not only in  $\phi$ -1D, but also in  $\theta$ -1D, at least in the micro-world QM state (like that in H-atom's n=1 electron). In the macro-world, this kind of RF motion (that is represented as the "ih" unit) in the Schrodinger equation, or the solution, or the wave function may also exist. For example, as I explained in SunQM-2's section-III, "inside the Sun it is the collection of matter waves (of all atoms) that doing the RF".

This is the best answer I can have right now. Like many other scientists, I am still looking for the better explanation for this question. After all, the discovery of {N,n//6} QM structure made me very sure that our Solar system is governed by the quantum mechanics.

**3)** To answer online reader "mingcheng99" (<https://bbs.creaders.net/...>)'s one early question about dynamics vs. kinetics, here is the update in SunQM-1s1's section XI: "The {N,n} QM dynamics tells us that a {-2,1} celestial body must exist **dynamically** during a star collapse into a neutron star (or black hole). But it does not tell us whether this {-2,1} stage is kinetically stable enough to be observed astronomically". Note: the yellow highlighted "dynamically" is newly added. The point I want to address is: For any QM state that exist dynamically in a mechanical process, it may or may not exist kinetically (meaning this QM state may have too short lifetime so that it becomes an unobservable transient state).

Note: In the Acknowledge of my SunQM series papers, I cited the (<https://bbs.creaders.net/...>) online reader/writer "mingcheng99", but I often misspelled as "MingChen99", apologize for that.

Note: During my 10 years closed-door {N,n} QM research, usually I don't read (and even don't search for) the formal scientific articles (that may relate to my QM study) that published recently (i.e., after 2016). However, for time-killing, (several years ago) I often read the website (in Chinese) at, <http://bbs.creaders.net/education/>, or [bbs.creaders.net/tea/](http://bbs.creaders.net/tea/), or [bbs.creaders.net/rainbow/](http://bbs.creaders.net/rainbow/). Thanks the website <http://bbs.creaders.net/> mentioned mingcheng99's comments, and I happened to see it, and thus I answered it here to explain my study result.

**4)** [http://bbs.creaders.net/education/bbsviewer.php?trd\\_id=1384050](http://bbs.creaders.net/education/bbsviewer.php?trd_id=1384050)

**网友问:** 那么你能给出时间预测? 粗略的也行。

**答:** 量子力学分为(初级的) Time independent 和(高级的) Time dependent。我现在研究的是 Time independent, Schrodinger 方程中的波函数只有状态参量, 没有时间参量。所以现在我无法给出时间预测。详见我的论文: SunQM-3: Solving Schrodinger equation for Solar quantum mechanics {N,n} structure. <http://vixra.org/pdf/1805.0160v1.pdf> (submitted on 2018-05-06), 中文题目: SunQM-3: 解析太阳系 {N, n} 量子力学结构的薛定谔方程。

**5)** [http://bbs.creaders.net/tea/bbsviewer.php?btrd\\_id=5179880&btrd\\_trd\\_id=1391603](http://bbs.creaders.net/tea/bbsviewer.php?btrd_id=5179880&btrd_trd_id=1391603)

**网友"365"问:** "科学的目标在于解释现象。任何理论最终必须落实到实验上, 如果没有核能的发现, 相对论其实很难被接受的..."

**答:** 太阳系量子力学与相对论很不相同。相对论如果在今天发表也很难被立刻接受, 因为它与牛顿力学之间跳跃太大。而太阳系量子力学对于任何一个大学生, 只要他学过量子力学, 就会立刻觉得这是理所应当的结果。

**6)** <http://bbs.creaders.net/> 网友 "goodaday" 问: "能告诉俺们你的结论是什么?"

**答:** 科学家们已经测量出地球内部主要有三层: solid iron core, liquid iron core, mantle. 但对木星, 土星等的内层结构还不是很确定。我现在建立了一种基于量子力学模型的方法来推测木星, 土星等的内层有几层核, 每层核的质量密度是多少。。。

**7)** [http://bbs.creaders.net/life/bbsviewer.php?trd\\_id=1391666](http://bbs.creaders.net/life/bbsviewer.php?trd_id=1391666), 问: 量子星际学的民科, 来算算月亮是怎么回事

**答:** 见论文 SunQM-1s3: Applying {N,n} QM structure analysis to planets using exterior and interior {N,n} QM. <http://vixra.org/pdf/1805.0123v1.pdf> (submitted on 2018-05-06) Section "III. Determine Moon's p{N,n} QM structure".

8) [http://bbs.creaders.net/tea/bbsviewer.php?trd\\_id=1360771](http://bbs.creaders.net/tea/bbsviewer.php?trd_id=1360771), 问: 与 zhf, mingchen, 职老, 等同学探讨双缝衍射, (by 五十肩)

答: 上次对 zhf 同学的双缝衍射的解释中几率波波速会大于光速表示费解。但最近又想到在量子缠绕里, 信息的传播速度可以是无限的。所以几率波与信息波是否等效? 如果二者等效, 则 zhf 同学的双缝衍射解释中的这一问题好像就不存在了。虽然这是我自己想出的, 但不排除其他人也已提出类似的想法, 我没有查过。我也不会去做这个课题。另外, 建议 zhf 同学的双缝衍射的解释中加上些数学推导, 比如教科书中的  $|\Psi|^2 = |\Psi_1 + \Psi_2|^2 = |\Psi_1|^2 + |\Psi_2|^2 + 2|\Psi_1||\Psi_2|\cos\phi$  而  $2|\Psi_1||\Psi_2|\cos\phi$  则是干涉项。若能从数学上直接推导出几率波与信息波等效则为更好。否则的话, 诸位有可能只是众多有类似想法的人中的一个。

9) [http://bbs.creaders.net/iq/bbsviewer.php?trd\\_id=1338037](http://bbs.creaders.net/iq/bbsviewer.php?trd_id=1338037), 问: 一点建议

送交者: jingchen 2018 月 07 月 26 日

Re: 太阳系量子力学结构周期表(之二) by 五十肩 于 2018-06-29 11:39:37

先赞一个, 我有类似的想法, 就像你说的, 很多人都有类似的想法。但是你做出来了, 祝贺!

能否建个博客? 这样, 你的文章就会有更多人读到, 你的理论被更多人了解。

答: 谢谢你的阅读和鼓励。也谢谢你的建议。很想将我的研究论文在学术杂志上发表, 但至今。。。如果将我的研究论文发表在博客上, 那就有可能与学术杂志彻底无缘了。据我所知学术杂志不太可能会刊登已在博客上全文发表的研究论文, 甚至在预印本网站上发表的有些都需拿下。谋事在人, 成事在天。我已经做了我所能做的, 剩下的一切随缘。再次感谢。

10)

量子物理民科(之)本轮记, by 五十肩 ([https://bbs.creaders.net/education/bbsviewer.php?trd\\_id=1704367](https://bbs.creaders.net/education/bbsviewer.php?trd_id=1704367))

40 多年前读大学期间阅读有关托勒密地心说的科普文章时, 对于太阳行星环绕地球运动的本轮解释感到很新奇且不可思议。2016 年后看到 "3Blue1Brown" 的有关傅里叶变换的视频 (<https://www.youtube.com/watch?v=r6sGWTCMz2k>) 之中用大大小小的 300 个轮子转动画出傅里叶的头像, 感到真是神奇。但是我根本没有意识到这些个转动的轮子与地心说中的大小本轮有什么关系。A few weeks ago, after I read a popular science educational article at <https://bbs.wenxuecity.com/>, I learned that these large and small epicycles are the Fourier components that were used to reconstitute the precise track of a planet's orbit. 借此机会感谢所有科普文章的那些作者们, 你们的科普文章不但给大众普及了科学知识, 而且在不经意之中有可能会触发一些全新的思想发现。这对像 {N, n} QM 这样的新理论的发现和发展都起到了重要的帮助。(2024 年 12 月记于加州)

Note: During my 10 years closed-door {N,n} QM research, usually I don't read (and even don't search for) the formal scientific articles (that may relate to my QM study) that published recently (i.e., after 2016). However, for time-killing, (several years ago) I often read the website (in Chinese) at, <http://bbs.creaders.net/education/>, or [bbs.creaders.net/tea/](http://bbs.creaders.net/tea/), or [bbs.creaders.net/rainbow/](http://bbs.creaders.net/rainbow/), or <https://bbs.wenxuecity.com/>. Thanks the website <https://bbs.wenxuecity.com/> mentioned this popular science education article, and I happened to see it, and thus I used it here to support my study result.