

# Mathematicians, Physicists and Technologists

Carlos Alejandro Chiappini

## ABSTRACT

### ENGLISH

The mutation of the science we call physics does not go unnoticed when Einstein published his famous articles. I refer to this mutation the reflections contained in this document.

This file is available in spanish with the title Matemáticos, Físicos y Tecnólogos.

## Part 1 - Newtonian Attitude

In the publication of the Principia appears in Latin the phrase *no do hypothesis*. Newton included it because he considered it essential to base physics on observations and/or factual detections. That did not invalidate the use of mathematics.

Newton's work has spread throughout the planet and throughout all centuries that passed until today. Even if that had not happened, we could still evaluate Newton's scientific behavior. I find a lot of success in his way of expose the investigation of gravity, warning that he only published the law that relates masses, distance and force, without including the physical cause of gravitation because it exceeds the resources that he had at that time. He clarified that before publish hypothetical speculations he preferred leave the task for generations later.

Newton had nothing of a timid, conciliatory temperament, lacking in harshness, or lacking the desire to shine intellectually. He greatly exhibited the traits opposites. This man became independent of his temperament to be faithful to what the Physics is like science, as he understood it and as it was understood in the course of millennia. His work denotes respect for knowledge and respect for the specific requirements of each science. This was for Newton something inalienable, which surpassed all the temperamental drives and all the desire to rise in the sphere of the science.

I have mentioned Newton without the slightest intention of homage. My intention is to observe and record the most lucid and honest lines of his scientific behavior.

## Part 2 - Methodical distinction between mathematics, physics and technology

Socially we do not doubt the differences between these three disciplines. Some similarities are quite evident too. Is it desirable in the scientific field an attitude tending to reduce differences to the point of eliminating them, deliberately or unintentionally? That is to say, is a movement unrelated to the example left by Newton regarding the mode desirable to build the physics?

I propose questions.

- 1. What do mathematicians use mathematics for?
- 2. What do physicists use mathematics for?
- 3. What do technologists use mathematics for?

### **I try to answer question 1.**

Although the verb use is a bit rustic for the context, reinforces the concept of activity within a discipline. Basically, Mathematicians use mathematics to develop the consequences of hypotheses that they propose, called postulates.

In mathematics everything has the character of an entelechy, that is, of something purely mental. That character is the great lubricant of the engine that drives the advancement of this science. The mathematical entelechy is not the product of a hallucination. It is coherent with the aim of exploring the entire scope that logic offers, without subjection to the signs from the sensible world. That entelechy endowed with a logical structure and called mathematics, is used by mathematicians to conceive more entelechys endowed with logical structure and create more mathematics.

To carry out a development, mathematicians do not need to consider the possibility of apply it to physics and/or technology. They only consider the need to take care of the internal coherence of what they develop and also take care of the coherence with the previously established mathematics. The task of mathematicians does not need windows to look at the factual world.

### **I try to answer question 2.**

Physicists use mathematics to formulate natural laws. What do they call natural laws? The concept of natural law is independent of mathematics, since it refers to regularities observed in the functioning of nature. The regularities of many phenomena are better expressed by mathematics than by verbal descriptions. This motivates the formulation of physical laws in mathematical terms.

In physics, mathematics is not used to develop the consequences of hypotheses purely based on entelechies. It is used to express natural laws. Some Philosophers try to show how hypotheses purely based on entelechies can infiltrate physics and remain as long as they are undetected.

The phrase *hypothesis purely based on an entelechy* appears repeatedly. That is why I will use the abbreviation *h<sup>o</sup>e* which is formed with the initials of the words hypothesis and entelechy.

Physics owes a lot to these philosophers, since it progresses every time a *h<sup>o</sup>e* is eliminated and a natural law is incorporated. Going only as far as allowed the known laws in his time, Newton sought to avoid the *h<sup>o</sup>e*. For that reason he left for later generations the task of investigating the physical cause of gravity.

### **I try to answer question 3.**

In technology, mathematics is used to formulate the properties of systems that make possible to achieve practical objectives.

The optimization of these systems usually depends on natural laws. That's why the technologists study and apply these laws. Nothing prohibits a technologist from investigating natural regularities and formulate laws. In that case the technologist works for two bosses. Technology is one and physics another.

The technologists Penzias and Wilson participated prominently in the investigation of the cosmic microwave background, cosmology theme. In this task they assumed the role of physicists.

## Part 3 - Counterphysics

Why do I present that neologism? It is the shortest way of referring to the replacement of natural laws by *h<sup>o</sup>e*. It's like removing drinking water from a container and replace it with a toxic, transparent, colorless and odorless liquid, which by its appearance may be mislabeled as drinking water.

Has counterphysics ever existed? The only chance I have to answer is to express my conviction. Each person will be able to object to it from their perspective. Although I try to attenuate my subjectivity as much as possible, I suppose there is always something left of it.

What do I base my conviction on? I respond in the subsections that follow.

### 3a - Relativistic counterphysics

The basis of my conviction is the subject that in classrooms and in current bibliography is named modern physics, validated since 1905. This opinion forces me to point out in that matter the *h<sup>o</sup>e* that have displaced various natural laws. Fortunately a group of scientists that includes Max Planck, Henri Poincaré, Louis de Broglie, Erwin Schrödinger, David Bohm and more have pointed out some *h<sup>o</sup>e* in the collection of theories called modern physics, later transferred to the standard model.

The development of counterphysics happened in stages of increasing complexity. In the initial stage, called special relativity, we can recognize the first *h<sup>o</sup>e* that replaced physical laws.

My conviction → the pair of postulates proposed by Einstein is insufficient to formulate a natural law. Why insufficient? What is missing to achieve the sufficiency?

There is a lack of a postulate that physically defines spacetime. Example ? Although the objective of this document is not to build a physical theory, I write examples to reveal my way of thinking.

*Spacetime is an infinitely extensive dynamic field that has density equal to zero.*

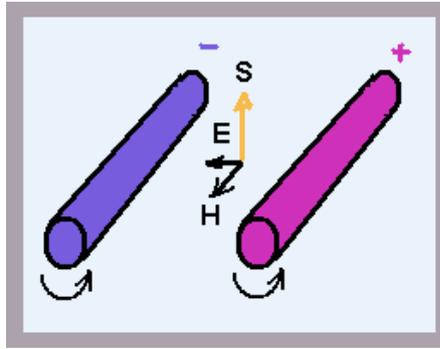
In that context the formulation of density is beyond my scope. I will also add a question. Would such a postulate be equivalent to a physical definition of space time ? I am inclined to answer affirmatively. That means that my conviction calls for a relativistic theory that includes a physical definition of the space time. Such a definition has not been included until today. That is why the act of claiming it directs the mind toward the future.

Could a dynamic field that has density equal to zero physically exist? I tend to answer affirmatively, because the operational definition of zero is the sum of two opposite terms. The dynamic field that defines spacetime is necessarily a dual field, with two mutually perpendicular components. Two components make it possible the dynamic exchange between them. Being mutually perpendicular they can operate without mutual prejudice.

Do we know a field that meets these requirements? Yes, the electromagnetic field. So the definition could be more specific.

*Spacetime is an infinitely extensive electrodynamic field that has density equal to zero.*

Instead of appearing as a pure entelechy, spacetime appears in that definition as a physical phenomenon. Reason demands that it be a simple and elementary phenomenon. Is a simple and elementary model of spacetime operationally conceivable? I lean towards an affirmative answer and propose a naive example, simply to hint at the type of idea that inspires my conviction.



The figure represents a pair of parallel cylinders that rotate in the same direction. One has a positive electrical charge and the other has a negative electrical charge. In this configuration the electric field  $\vec{E}$  is perpendicular to the direction of the cylinder axes. The direction of the magnetic field  $\vec{H}$  is parallel to these axes. This meets the requirement to be  $\vec{E}$  and  $\vec{H}$  mutually perpendicular. The Poynting vector  $\vec{S}$  is perpendicular to the plane where  $\vec{E}$  and  $\vec{H}$  are located and points towards the top of the figure. Another pair of rotating cylinders, symmetrical with respect to the pair in the figure, can create opposite fields to balance to  $\vec{E}$ ,  $\vec{H}$  and  $\vec{S}$ .

The energy of the electric field has a negative sign, because the cylinders attract each other. The energy of the magnetic field has a positive sign because its nature is kinetic. If both energies have the same absolute value, the sum is equal to zero.

Now let's think about the limit of that system when its size tends to zero, with the space full of those infinitesimal systems. In a space of this type net densities of physical quantities are equal to zero, although each point houses a dynamic microsystem.

I am not trying to develop the example. I'm just trying to show that the nature of the electromagnetic spacetime is conceivable without  $h^{\circ}e$ .

General relativity lies outside of what I can naturally understand. By that I do not include a section dedicated to that theory.

### 3b - Quantum counterphysics

The objective of this document is to show examples of  $h^{\circ}e$  that replaced physical laws. In this section I will comment on the two cases that I consider most harmful. One is Max Born's proposal referring to interpreting the wave function as probability distribution. Another is the way of building quantum electrodynamics.

Interpreting the wave function as a probability distribution were excluded the laws of the physical constitution of elemental entities. Collectively the proposal was accepted after unsuccessful attempts to formulate the wave function in terms of known physical laws.

If the probability distribution referring to a physical phenomenon has the mathematical format of a wave function, that means that the phenomenon operates with one or more waves that propagate physically.

Initially much work was dedicated to the objective of knowing the physical nature of those waves. Are they mechanical? Are they electromagnetic? Are they of a still unknown type? Max Born assumed that they are not waves of something physical. He stated that they are only probability distributions that do not admit a physical model and, therefore, an abstract postulate is necessary to incorporate them into the theory.

Quantum theorists gave up physics and plunged into the lagoon of  $h^{\circ}e$ . With little delay they paid the price, since no consensus was possible between the main schools and various ways of building quantum theories appeared. The uncertainty encompassed much more than atomic phenomena. It spread to the minds of physicists and everything they investigated. It is the

inevitable uncertainty when physical laws are replaced by  $h^{\circ}e$ .

I will briefly comment on the case of quantum electrodynamics. It was built combining Maxwellian electrodynamics with procedures of quantum theory. To appreciate the damage that this causes we need access to a document titled James Clerk Maxwell Conocimiento Prohibido, available for free at the link below.

<http://www.vixra.org/abs/1711.0313>

This document shows how Maxwellian electrodynamics has been deliberately stripped of its essential field, which is the harmonic polarization of the vacuum when an elemental wave spreads in that medium. The mutilation has been caused by discarding the complex solution of the wave equation in the case of vacuum, to use only the transversal solutions.

When the development begins with the complex exponential wave function, they appear simple theorems that result in the foundations of all branches of physics, before and after the year 1900. I insist, all of them, including relativity, quantum behavior, particle physics, gravitation and a metrological scheme of units defined by natural laws, not by conventions.

I have mentioned the universal scope of Maxwellian electrodynamics because without mentioning it could not describe the damage caused by the way quantum electrodynamics was built.

In itself, Maxwellian electrodynamics contains the quantum foundations, implicit in Maxwell's equations. It's legitimate quantum electrodynamics. The attempting to combine it with procedures of quantum theory amounts to amputating the leg of a healthy person and replace it with a prosthesis. After that surgery the person's body will function poorly, with many difficulties. The same thing happened in quantum electrodynamics. Many calculations gave infinite results, evidencing an inadequate formulation. An additional mathematical procedure was invented, which generated a opposite series of infinities to counteract the original series, so that only the finite terms of the calculation remain. This trick was called renormalization and was pragmatically useful. A pragmatic appeal is admissible in the technological field, which looks for ways to calculate how a planned design will work. A scientific theory does not admit resources of that type, because its formulation is governed by natural laws and not by the urge to achieve engineering goals in peremptory deadlines.

Throughout the 20th century and into the latter part of the 21st century, the incessant sequence of war actions forced scientists to serve as technologists. In that context the opportunities to distinguish between science and technology were very rare.

The two mentioned deficiencies, wave probability and forced overquantization of Maxwellian electrodynamics, cause perplexity in quantum theory and anomalous results. Quantum theory is part of the standard model, which since its invention was repeatedly patched each time the experiments gave results and the model others incompatible with empirical data. At the time of writing this the most recent case corresponds to the semileptonic decay of the B meson, which gives experimental results different from the theoretical calculations. The more different the more the experimental techniques are perfected.

## **Part 4 - Final Note**

As I previously expressed, the objective of this document is to highlight a defective way in building theories. This mode replaces natural laws with hypotheses purely based on entelechies.

The price of this replacement has been to build theories that in a few decades are refuted by the experimental results.

The universal theory legitimately based on natural laws is Maxwellian electrodynamics. The theorems deduced from it give the foundations of all branches of physics, without exception.

All opinions contained in this document are based on another, titled James Clerk Maxwell Conocimiento Prohibido, available for free at the link below.

<http://www.vixra.org/abs/1711.0313>

---

Carlos Alejandro Chiappini

carloschiappini@gmail.com

Quilmes, Buenos Aires, Argentina

November 13, 2023

