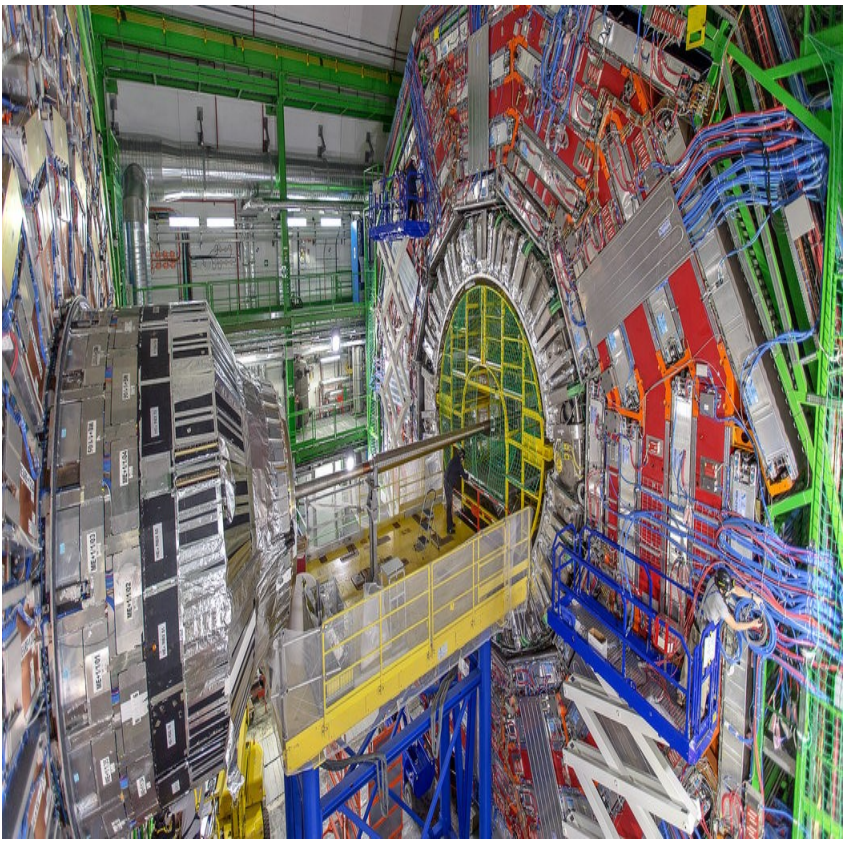

150 YEARS PHYSICS based on the WRONG EQUATION

150 YEARS OF PHYSICS BASED ON THE WRONG EQUATION

Light contains the key to open the doors to Heaven.
Unfortunately, the same key fits on the doors to Hell

Author:	Wim Vegt
Country:	The Netherlands
Website:	https://wimvegt.topworld.center
Email:	j.w.vegt@topacademy.center

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1.0 Introduction

When we look at todays Physics, we can only be impressed by an enormous amount of knowledge and a complete New World of technical applications that has never been in the world before. We now live in the century of the impressive victory of the new science and the new technology over the old-fashioned world and the old-fashioned way of thinking.

Great changings in the way of thinking and the technological achievements are mostly characterized by an important scientific publication in a century that changes everything in that century. We can recognize the century of Isaac Newton who triggered in 1687 the large changings in thinking with his famous publication "Philisophiae Naturalis Principia Mathematica" (Mathematical Principles of Natural Philosophy).

We recognize the century of James Clerk Maxwell who triggered in 1865 the large changings in thinking with his famous publication "A Dynamical Theory of the Electromagnetic Field".

We recognize the century of Albert Einstein who triggered in 1905 the large changings in thinking with his famous theory of Special Relativity represented in his publication "On the Electrodynamics of Moving Bodies". Manifesting a "New Theory" and a "New Way of Thinking" with important contributions of Hendrik Lorentz, Henri Poincaré and Hermann Minkowski.

It is recognizable that with the suddenly changing in thinking in a new period, a new kind of mutual common sense and a general agreement by many scientists of the the new theory and the new way of thinking rises. The new theory becomes like a medieval town with a large high wall around it. The New Theory will be protected by common sense and mutual agreement.

This new way of thinking settles down in the scientific society and become immovable. Other options disappear and simply do not exist anymore.

Different from the alpha and the gamma sciences, the beta sciences are being developed by a kind of a LEGO system. Building blocks built one after another and built on top of each other. Like we build with the LEGO system houses and castles using the same LEGO building block over and over again, we build in the beta sciences grand theories, using basic the same basic equations over and over again. A large shift in the beta sciences happens when a new mathematical building block has been developed. Like the equations of Newton or the equations of Maxwell or the Schrödinger and the Dirac equations. These fundamental equations form the mathematical LEGO system of our modern scientific world.

Because these mathematical building blocks are being used over and over and again in numerous applications over a period of of more than 100 years, a general scientific common sense rises around these mathematical building blocks. This scientific common sense protects these mathematical building blocks like a high wall around a medieval town.

A fundamental problem rises when one of these building blocks is not correct or turns out not to be correct under certain conditions. Like the famous Law of Newton for the relationship between acceleration (a), mass (m) and force (F): “F = m a” turns out not to be valid at velocities near the speed of light because at these velocities the mass is changing. It took a long time before Albert Einstein’s theory of general relativity had been accepted, because his theory of general relativity was in contradiction with the famous well-known mathematical building blocks which had already been used and being protected for hundreds of years. But nowadays Einstein’s famous theory of general relativity has been accepted world-wide.

This book describes a comparable conflict in the modern beta sciences and brings the well-known and generally accepted Modern Physics of the last 150 years in conflict. Because when a fundamental mathematical building block, which has been introduced 150 years ago and has been used to develop the Modern Physics during the last 150 years, turns out to be wrong (or not complete), a fundamental problems rises in Modern Physics, developed during the last 150 years.

Because when one of the many mathematical building blocks turns out to be wrong, the whole physics which has been built by using all these mathematical building blocks together might be wrong or not complete.

This situation happens in relation with the well-known Maxwell Equations, presented 150 years ago in the famous publication: "*A Dynamical Theory of the Electromagnetic Field" in 1865*. which has been used as a fundamental mathematical building block in many modern physical theories.

In Maxwell's time there were no optical LASERS (**L**ight **A**mplification by **S**timulated **E**mission of **R**adiation) and the outcome of his theory was in his time completely in correspondence with what could be measured at that time. The value for the speed of light, calculated from the Maxwell Equations, corresponded almost exactly with the value for the speed of light measured in 1862 by Léon Foucault by a system of rotating mirrors and measured in 1877 by Albert Michelson (300.140 [km/s]).

But nowadays there rise several problems with Maxwell's theory for the electromagnetic field. Since the existence of the LASERS it became clear that the speed of light is not always the same in every direction. When a beam of light, generated by a LASER, propagates with the well-known speed of light "c = 299.792 [km/s]" in the z-direction, the

speed of light equals zero in the x-direction and the y-direction (in a orthogonal x,y,z frame).

This new phenomenon cannot be explained by Maxwell's Theory. In Maxwell's Theory the speed of light has to be exactly the same in every direction. This is clearly not the fact for a LASER beam. And also for the projection of a slide on a screen, it is clearly that the speed of light within the plane of the screen equals zero. Because the slide we observe does not move. While the projection beam itself moves towards the screen with the speed of light "c", the beam clearly remains focused and does not move within the plane, perpendicular to the direction of propagation.

Another effect which cannot be explained by Maxwell's Theory about electromagnetism has been demonstrated within the IBM research group. A new, until 1995 unknown experiment has been conducted by: O. Gunawan, Y Virgus and K. Fai Tai to demonstrate a subtle hidden feature in electromagnetism[(1),(2,),(3)] - a previously unknown field confinement effect that they named the "camelback effect" in a system of two lines of transverse dipoles.

In electromagnetism, the elementary source of electric field and magnetic field can be respectively modeled as a point charge - a hypothetical charge located at a single point in space - and a dipole, a pair of equal and oppositely charged or magnetized poles separated by a distance. Imagine we line up two rows of magnetic dipoles as shown in Fig (a), and we try to measure the strength of the magnetic field along the center axis. The magnetic field is certainly stronger at the center and diminishes away from it. However, if the length of the dipole line exceeds certain critical length, a surprising effect occurs: the field gets slightly stronger near the edges and produces a field confinement profile that looks like a camel's back—hence the name of the effect. The IBM team has reported this discovery with detailed experimental and theoretical studies in two recent publications and patents.

This surprising discovery is exciting for a few reasons. First, it represents a new elementary one-dimensional confinement potential in physics, joining the list of well-known potentials such as Coulomb, parabolic, and square well. Second, this effect becomes the key feature that enables this system to serve as a new class of natural magnetic trap called parallel dipole line (PDL) trap with many possible exciting applications. This camelback effect and the related PDL magnetic trap can be realized using special cylindrical magnets whose poles are on the curved side and a graphite rod as the trapped object.

This new, until 1995 unknown, effect can only be explained by electromagnetic interaction, described in the New Theory in equation (5) .

A recent experiment[(5)] in 2019 at the Yale University in New Haven C.T. USA published in Nature with the title: "*To catch and and reverse a quantum jump mid-flight*" **by**: Z. K. Minev, S. O. Mundhada, S. Shankar, P. Reinhold, R. Gutiérrez-Jáuregui, R.J. Schoelkopf, N. Mirrahimi, H.J. Carmichael and M. H. Devoret conflicts a fundamental aspect of the Copenhagen Interpretation related to "Fundamental Uncertainty" (Probability) represented within the "Standard Model" in Quantum Physics.

In quantum physics, measurements can fundamentally yield discrete and random results. Emblematic of this feature is Bohr's 1913 proposal of quantum jumps between two discrete energy levels of an atom. Experimentally, quantum jumps were first observed in an atomic ion driven by a weak deterministic force while under strong continuous energy measurement.

The times at which the discontinuous jump transitions occur are reputed to be fundamentally unpredictable. Despite the non-deterministic character of quantum

physics, is it possible to know if a quantum jump is about to occur? Here we answer this question affirmatively: we experimentally demonstrate that the jump from the ground state to an excited state of a superconducting artificial three-level atom can be tracked as it follows a predictable 'flight', by monitoring the population of an auxiliary energy level coupled to the ground state. The experimental results demonstrate that the evolution of each completed jump is continuous, coherent and deterministic.

The only explanation for this deterministic effect has been described within the new theory in equation (5.7) which originated form the deterministic electromagnetic field.

It has been generally accepted in Physics that the Speed of Light is a Universal constant and has the same value of 299792 [km/s] in every direction. This has been accepted by almost every physicist. An example is a LASER beam. The speed of light in the direction of propagation equals 299792 [km/s] indeed. But in the transverse directions (perpendicular to the direction of propagation) the speed of light for the LASER beam equals zero. That is quite a difference. Maxwell is not able to explain this phenomenon. According to Maxwell the speed of light equals the same in every direction and Albert Einstein has built his theory of relativity on this.

How to explain this phenomenon? By the fact that a beam of light is always in a perfect equilibrium with itself and its surrounding. And 3 different forces act on a beam of light in both different directions.

In the direction of propagation, the speed of light has been controlled by two forces. The radiation pressure (which is equal in every direction) pushes the light pulse forward. At the speed where the force of inertia counterbalances the

radiation pressure completely, exists equilibrium. And that happens exactly at the speed of 299792 [km/s].

In the directions perpendicular to the direction of propagation something very different happens. The electric field vector acts on the divergence (electric charge density) of the electric field at the boundaries of the beam and counterbalances for 50 % the opposite directed radiation pressure. The magnetic field vector acts on the divergence (magnetic charge density) of the magnetic field at the boundaries of the beam and also counterbalances for 50 % the opposite directed radiation pressure. Together the whole system is in balance. Because the speed of light in the transverse directions equals zero the force of inertia of the energy can be neglected in the transverse direction which has been described in equation (5) in the article: https://osf.io/73pju.

There is no other conclusion than the conclusion that the Maxwell Equations are "wrong" or at least "not complete". The right equation(s) have to describe both possibilities. The possibility that the light moves in every direction with the exactly the same speed of light "c" like the light being emitted by the sun. And the possibility that the light moves only in one direction and equals zero in the directions perpendicular to the plane of propagation like the propagation of a LASER beam.

A second conclusion can only be that fundamental quantum mechanical relations like the Schrödinger wave equation and the relativistic Dirac equation both originate from a deterministic field like an electromagnetic field which has been demonstrated in the new theory in equation (5.7) .

To find these new equation(s) we observe that the Maxwell equations are not in unification with Newton's theory of equilibrium of forces. The Maxwell Equations are not in unification with Newtons 3rd law "action = - reaction".