

## The Old New Physics

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**Physics is one most important field of science, which also underlies all natural sciences. Therefore, the validity of its tenets is vitally important *per se*, consequently for the scientific community as well as for the society as a whole. In this text conflict with absolute truths, internal contradictions and logical errors such as *petitio principii*, are identified as ravaging the fundamentals of physics, along with the misinterpretation of motion.**

**Newton's laws of motion, Einstein's relativity and quantum mechanics are critically analyzed in view of their violation of absolute truths as well as logic. It is concluded that the quest for new physics should begin with expanding Newton's laws of motion to correctly account for motion, quantum mechanics should be replaced by reworking classical mechanics to account correctly for motion and Einstein's relativity should be removed in its entirety.**

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**Sir:** This paper summarizes succinctly, but with sufficient rigor to make it compelling, the experience of the author and his conclusions, hardly short of definitive, regarding the urgent need for dramatic reform in physics and its return to classical roots, albeit substantially corrected for the proper understanding of motion. Regard for the absolute truths in physics, ridding physics of errors in logic, of internal contradictions, and returning it to reason, is the goal of this reform. This and other texts are the underlying basis of the ongoing efforts by the author, devoted to returning physics and science as a whole to its rational roots of governance by the scientific method and led by the understanding that the accomplishment of such a daunting task cannot be achieved without the concerted effort of the entire community. The interests of the community are not detached from those of properly functioning science but are an integral part of it, correct science being a determinant of its well-being.

Despite the voluminous literature and deceitful complexity, the kernels of what underlies the stunning superstructures of current theoretical thought in physics are based on some inordinately expounded,

in actuality simple but wrong ideas, which can be addressed critically even in a short document such as this. Therefore, make no mistake, the size of this document does not correspond to the magnitude of the problems it addresses and the gravity of their unsuitability as the foundation of science.

In an effort to bring about definitive answers to what now are found to be sticky problems in physics, the author has been resorting for some time to the unquestionable existence of **absolute truths**, as an inviolable tool in search for the truth, no matter how vehemently, although un-deservedly, their existence is denied in some quarters of the physics community.

For example, it cannot be denied that in a given system, definitions of velocity,  $v = \frac{dx}{dt}$ , and acceleration,  $a = \frac{dv}{dt}$ , have the firm status of absolute truths. Express  $dt$  from each definition. These expressions of  $dt$  are equal to each other, leading to  $\frac{1}{2}dv^2 = adx$ , which further can be integrated, for  $a = const$ ,  $\int_0^v dv^2 = 2a \int_0^x dx$ , arriving finally at  $v^2 = 2ax$ . Proceeding from the fact that this equation results from absolute truths, the author has elevated the expression  $v^2 = 2ax$  itself to the status of the most fundamental equation of mechanics, inevitably showing that when a free body is transported from rest across a real distance  $x$  under the action of a constant force, it must change velocity, respectively, there must be a change in its kinetic energy. Based on that absolute equality and the mentioned inevitable consequence from it, it must be concluded that motion in physics has not been completely defined through Newton's laws—Newton's second and third laws being in contradiction with Newton's first law indicating when motion actually occurs, if these laws are referred to as laws of motion. Newton's second law is a law of rest because it ignores the inevitable change of kinetic energy when a free body moves under the action of a constant force. This omission is a major cause for the problems physics has today.

That Newton's second law is a law of rest is confirmed also by observing the most general relations in mechanics, from which Newton's second law is derived; namely, Hamilton's equations,  $\frac{\partial H}{\partial x} = -\dot{p}$  and  $\frac{\partial H}{\partial p} = \dot{x}$ . From these equations it follows directly, provided conservation of energy,  $H = T + V = const$ , is in effect, that  $\frac{dx}{dt} = 0$  and  $-\frac{dp}{dt} = 0$  or  $x = const$  and  $p = const$ . The system is at rest. Thus, in order for the system to be in motion, as the Hamilton's equations are taken to suggest; that is, in order for  $x \neq const$  and  $p \neq const$ , the total energy  $H$  of that system, consisting of the kinetic energy  $T$  and potential energy  $V$ , has to be  $H = T + V \neq const$ . This means

that conservation of energy must not be obeyed, a disobeying, which contemporary physics blanketly denies. Conservation of energy as a principle in science will be discussed elsewhere.

It must be noted that the above problem of Hamilton's equations, being equations of rest and not of motion, invokes, before anything else, a big question mark on quantum mechanics, since the Hamiltonian has as its basis said Hamilton's equations in classical physics.

Violation of absolute truths mandates also the outright abandonment of Einstein's relativity. Indeed, in a given system at a given moment in a given place, time can only have one single value, independent of whether said time is measured by a clock at rest with that place or is measured by a moving clock, which happens to be at that moment in that place. Therefore, there can never be an experiment, including using GPS, which will show different times on the faces of the above-mentioned clocks, as Einstein's relativity maintains. Due to the above, the wrong notion called "time-dilation" must be eliminated from the public mind.

Another absolute truth; namely, that in a given system one body cannot obey simultaneously two different laws of motion, has been violated by the derivation presented in §10 of ref.<sup>1</sup> It would have been enough for the inertial systems observed, both at rest and in uniform rectilinear motion, to present trivially  $m \frac{d^2\xi}{dt^2} = \epsilon X'$  in  $k$  as  $m \frac{d^2x}{dt^2} = \epsilon X$  in  $K$  and not falsely claim a big discovery by redundantly presenting for the same body in  $K$  that same  $m \frac{d^2\xi}{dt^2} = \epsilon X'$  in  $k$  as  $m\beta^3 \frac{d^2x}{dt^2} = \epsilon X$  in  $K$ . This is a blatant violation of an absolute truth in physics—the uniqueness of a law governing the motion of a body in a given system. Newton's second law, describing a force acting on a body in  $K$  at time  $t$  is only  $m \frac{d^2x}{dt^2} = \epsilon X$  and is by no means also  $m\beta^3 \frac{d^2x}{dt^2} = \epsilon X$ , as derived in §10 of ref.<sup>1</sup> Such a derivation is akin to deriving that  $1 = 2$ , which is a gross violation of an absolute truth both in physics and in mathematics.

Notably, similar ignoring of the absolute truth that at a given temperature the system can obey only one single equilibrium; that is, that 1 cannot equal 2, is seen in another study by the same author<sup>2</sup>, unrelated to ref.<sup>1</sup> In ref.<sup>1</sup>, in his desire to derive Planck's radiation law  $\rho = \frac{8\pi h\nu^3}{c^3} \frac{1}{e^{\frac{h\nu}{kT}} - 1}$ , the author writes for  $T_1$  the balance equation  $p_n e^{-\frac{\epsilon_n}{kT}} B_n^m \rho = p_m e^{-\frac{\epsilon_m}{kT}} B_m^n \rho + p_m e^{-\frac{\epsilon_m}{kT}} A_m^n$ , then observes that at  $T_2 \gg T_1$  this expression reduces

to  $p_n B_n^m = p_m B_m^n$ . Further, the author expresses  $p_n$  as  $p_n = p_m \frac{B_m^n}{B_n^m}$ , valid only at  $T_2$ , replaces it in the expression valid only for  $T_1$  and after some reordering "derives" Planck's formula. However, at  $T_1$  the system cannot obey simultaneously both  $p_n e^{-\frac{\epsilon_n}{kT}} B_n^m \rho = p_m e^{-\frac{\epsilon_m}{kT}} B_m^n \rho + p_m e^{-\frac{\epsilon_m}{kT}} A_m^n$  and  $p_n B_n^m = p_m B_m^n$ , so that  $p_n$ , expressed from the latter equation be a replacement of the  $p_n$  in the former equation. The equality  $p_n B_n^m = p_m B_m^n$  is not an absolute equality but is restrained by a constraint and cannot be used without that constraint. It is only valid at  $T_2$  and cannot be used at  $T_1$ . This example again shows a fundamentally flawed nature of thinking.

Complete failure of Einstein's relativity poses a problem for electrodynamics. Ref.<sup>1</sup> is unable to accomplish the goal it sets up at the beginning; namely, to correct the asymmetries in Maxwell's equations. Despite the impression, created in ref.<sup>1</sup> to the contrary, the Lorentz force has not been derived in ref.<sup>1</sup> from Maxwell's equations due to the same internal contradiction which was mentioned above. Thus, Maxwell's equations, especially Faraday's equation as part of them, continue to break down in deriving the known voltage measured in the unipolar generator, mentioned in ref.<sup>1</sup>

More importantly, the complete failure of Einstein's relativity leads to its inability to derive  $E = mc^2$ , a derivation so widely ascribed to it. The inability of Einstein's relativity to derive  $E = mc^2$  is not only due to its above-shown internally contradictory nature but also on a purely formal level. The attempt in §10 to derive  $E = mc^2$  by employing the Lorentz transformations fails due to the misinterpretation, when solving the shown integral, of the velocity  $v$  of the uniform rectilinear motion, wrongly equating it with the velocity  $\frac{dx}{dt}$ , associated with the force applied to the body moving at a uniform rectilinear motion with velocity  $v$ .

Further, Lorentz transformations, although mathematically concise, lack physical meaning as well and, therefore, also must not be retained in physics. Lorentz transformations destroy the concept of length because a rigid rod whose initial and end coordinates are, respectively,  $a$  and  $b$  at a given time  $t$  for both points, are transformed by the Lorentz transformations into coordinates  $a'$  at time  $\tau_1$  and  $b'$  at time  $\tau_2$ , where  $\tau_1 \neq \tau_2$ . Every Lorentz-transformed point along the  $x$ -axis has all other points either in the past or in the future, which is non-physical to begin with. Let alone that having no two transformed points along the  $x$ -axis existing simultaneously makes it impossible to define length between these two points.

Hence, the widely acclaimed “length-contraction” lacks physical meaning.

Needless to say, the above violations of absolute truths, wrongly passed on to society as scientific theories, have never been confirmed experimentally, neither can they ever be confirmed experimentally, despite the vigorous media propaganda to the contrary.

No better is the state of affairs regarding the mathematical background of quantum mechanics, if honestly approached, making it unsalvageable for the purposes of physics. Although having much more freedom than physics in creating valid abstractions, it should be recognized that mathematics also has its limits, governed by absolute truths. For instance, it is an absolute truth that division by 0 is disallowed in mathematics. Also, it is an absolute truth that 1 is not equal to 2. Equivalently, the following are some further absolute truths, pertaining to quantum mechanics, that cannot be denied no matter what spaces (Hilbert, rigged-Hilbert with Gelfand triple, Sobolev-Schwartz extensions, etc. etc.) in which we observe them.

Thus, the eigenfunctions of the position and momentum operators, respectively  $\hat{x}$  and  $\hat{p}$ , which quantum mechanics accepts as, respectively,  $x$  and  $-i\hbar\frac{d}{dx}$  (for simplicity, observing the one-dimensional case), cannot be normalized in any space.

Both  $\int_{-\infty}^{+\infty} \delta(x-a)\delta(x-a)dx = \delta(a-a) = 0$  and  $\int_{-\infty}^{+\infty} Ce^{-i\frac{p}{\hbar}x}Ce^{+i\frac{p}{\hbar}x}dx = C^2 \int_{-\infty}^{+\infty} dx = \infty$ , considered to be the normalization expressions for the eigenfunctions of  $\hat{x}$ , respectively, of  $\hat{p}$ , obviously show that these eigenfunctions are not normalizable in any Hilbert space, rigged or not. Therefore they cannot play the role of state-functions.

Thus, the postulated eigenfunction equations, constituting the foundation of quantum mechanics as a discipline separate from classical mechanics and purportedly improving on it, have no physical meaning in any space. Entities which have no physical meaning cannot further be used in any combinations in the hope that these combinations would somehow acquire physical meaning.

Schrodinger’s equation suffers from the same conceptual problems. They will be discussed elsewhere.

The sole fact that the postulated eigenfunction equations give rise only to non-physical entities requires abandoning of quantum mechanics right at this point. All studies in mechanics should be reverted exclusively back to classical mechanics with the necessary correction of its understanding of motion, to reveal the quantum character inherent in classical

mechanics.

Paradoxically, instead of abandoning quantum mechanics right after establishing the latter, proponents continue to use the non-physical entity  $\delta(x-a)$ , further attempting pseudo-normalization; that is,  $\int_{-\infty}^{+\infty} \delta(x-a)\delta(x-b)dx = \delta(b-a)$ , where  $a \neq b$  are constants. Alas, that is zero too because the  $\delta$ -function of a constant is 0. Zero is also the result of the pseudo-normalization of the momentum eigenfunction in position space  $\int_{-\infty}^{+\infty} Ce^{-i\frac{p_2}{\hbar}x}Ce^{+i\frac{p_1}{\hbar}x}dx$  because it again constitutes a  $\delta$ -function of a constant, which is zero. This unfounded assumption that the particle observed is “smeared” in space, being at two different positions at once and therefore  $a \neq b$  only aggravates the problem because it adds to the already senseless outcome also the logical error *petitio principii*; that is, is begging the question (the question contains the answer).

So, no mathematical equilibristics in the form of rigging the Hilbert space would be capable of saving quantum mechanics. Thus, planting its feet on the steady footing of absolute truths, physics becomes free from the clutches of mathematical speculation, causing it to stray from being an exact science and sets it on the road of clarity and rational development.

The opinion that this is how physics views matters nowadays and that nothing can be done about it must be met with a resounding no. Physics must not have senselessness and lack of logic as part of its fundamentals. The flat earth theory and Ptolemaic geocentrism had also been the scientific culture of its day but were removed from science when found not viable. As seen, the critique of quantum mechanics must be far more decisive than what was done in Einstein, Podolsky and Rosen<sup>3</sup> and later simplified by Bohm<sup>4,5</sup>, followed by Bell<sup>6</sup>. That wishy-washy critique has done even more harm than good, leading to the further senselessness of entanglement and non-locality, falsely raising hopes for the already mentioned quantum computing, teleportation and the like. The ultimate verdict concerning quantum mechanics must be one of definitive and final rejection.

It may seem strange that such brief arguments can be enough to bring down entire areas of physics but this is indeed all it takes to restore the truth in science. That is the nature of the scientific method. Unfortunately, all kinds of circumstances, extraneous to science, have been brought to bear, so that such an easy to discern flaws are being ignored and senselessness is maintained on a large scale, passing as science. It should be emphasized, however, that these flaws become easy to discern only after they are detected

and presented in a digest such as this. It requires not being blinded by the esoteric and fantastic coming out of flawed science but critically looking into the seemingly boring roots of the fundamentals. This means to forego the acclaim of society in favor of protecting the truth.

It is not to be ignored that the magnificent formal edifices, which have been created, rest on very simplistic, elementary errors made at the onset of setting forth theories such as Einstein's relativity and quantum mechanics.

Solution of all the problems should be sought in the realm of classical physics (classical physics excludes Einstein's relativity as well as quantum mechanics). For instance,  $\mathbf{E} = mc^2$  is contained in Newton's second law, modified to express motion correctly. This will be shown in another publication. Here it will suffice to show that  $\mathbf{E} = mc^2$  exists classically in Ampere's law, which in the usual notation is  $\nabla \times \mathbf{B} = \mu_0 \mathbf{J} + \epsilon_0 \mu_0 \frac{\partial \mathbf{E}}{\partial t}$ , with  $\epsilon_0 \mu_0 c^2 = 1$  leads to  $c^2 \mathbf{E} \cdot (\nabla \times \mathbf{B}) = \mathbf{E} \cdot \frac{1}{\epsilon_0} \mathbf{J} + \mathbf{E} \cdot \frac{\partial \mathbf{E}}{\partial t}$ . The dimensions of the latter are  $c^2 \left[ \frac{V}{m} \right] \times \left[ \frac{1}{m} \right] \times \left[ \frac{kg}{C s} \right] = \left[ \frac{V^2}{m^2 s} \right]$ . After opening the brackets it becomes  $c^2 \left[ \frac{kg V}{m^2 s C} \right] = \left[ \frac{V^2}{m^2 s} \right]$ , which after cancelations and reordering becomes  $c^2 [kg] = [J]$ , which are the dimensions of  $\mathbf{E} = mc^2$ .

Physics has so much more to offer than muddling through logical errors, violating absolute truths and presenting them as modern advanced physics. Com-

bine these errors with complicating mathematical apparatus as an end in itself and it is no wonder that basic notions such as time, space, energy, causality, etc., are left in a state of stupor. This can only serve to entertain the inattentive, while severely harming science and society. Avoiding the above and reworking classical mechanics to account for motion is what really constitutes the new physics that many are talking about and searching for.

## References

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