What do you know about quantum mechanics?

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Abstract

The real answer is that most people know nothing about quantum mechanics, including those who have been indoctrinated with the ideas of Einstein and Schrödinger, whom we consider the source of all evil.

In previous articles titled [How to Generate New Mathematics - Parts 1, 2, 3, and 4; Can We Think Outside the Box?; How to Integrate Quantum Mechanics into General Relativity and Modern Physics; and Quantum Mechanics: Theory and Application], we discussed how to apply Cairo Theory statistical techniques to solve problems and generate new laws and rules in most areas of classical and quantum physics, statistics, and pure mathematics.

The world of Quantum physics is different from that of classical physics and has not yet been precisely explored or even well defined.

This article uses the same techniques to study and redefine the Schrödinger equation in particular, and the subject of quantum mechanics in general, which is often neglected or imprecisely defined.

We assume that The first step in this essential reform consists of replacing the classical Schrödinger partial differential equation of 1927,

$i\,h(d/dt)\text{partial}\,[\Psi] = -h^2/2m[-\nabla^2\Psi + V(r,t)]\,\Psi$ . . . (1)

with its squared equivalent proposed by the author in 2022,

$U(x,y,z,t) = D(N).\,U\,(x,y,z,t) + S$ … (2)

Where U(x,y,z,t) and D(N) are two Laplace matrices of order nxn and S is the source limit vector nx1.

Note that the proposed quantum PDE equation (2) describes the energy density of a quantum mechanical system, $U(x,y,z,t) = \Psi\Psi^* = \Psi^2$, which is a physical quantity and has a physical meaning rather than the complex mathematical wave function Ψ.

D(N) is the transfer or transport matrix, written as follows:

$D(N) = B + B^2 + B^3 + \ldots + B^n$

in classical physics [2,3,4,5,6],

and

$D(N) = Q + Q^2 + Q^3 + \ldots + Q^n$

in quantum physics [7,8,9,10].

It represents the quantum energy density diffusion coefficient.

Clearly, $Q = \sqrt{B}$ [11,12]

The spatial-temporal evolution of the discrete numerical solution to the partial differential equation (2) is:

$U(x,y,z,\, t = Ndt) = D(N).(b + S) + B^N.IC$ … (3)

Where IC is the initial conditions vector = U(x,y,z,0).

Equations 2 and 3 are fundamental equations in what we call New Modern Physics [2,12,16,18].

We all know that the current definition of quantum mechanics or a quantum mechanical system as any expression that explicitly contains h is a trivial, incomplete, and misleading definition.

N. Bohr once said that anyone who claims to understand quantum mechanics with Bohr interpretation is either a liar or doesn't understand it at all.

It goes without saying that the above statement applies to both N. Bohr and E. Schroeder as well.

We propose the following definition instead:

The definition or solution of any set of quantum particles or energy density distribution in a quantum system is that in which the dispersion is negative, that is, the flow of energy is directed towards the internal center of the mass.

This is one of the key issues in the subject of this article.

Finally, it is important to note that this article does not aim to diminish the significant contributions of great physicists and mathematicians such as Einstein, Schrödinger, Heisenberg, Minkowski, Hilbert, Riemann, and others, but rather to address the most prominent shortcomings and limitations of their theories, where applicable.

Note: If you are not familiar with the universal laws of physics [21,22], please stop reading. This article is not intended for you.

I.A comprehensive introduction including theory and numerical results

Mathematics entered physics as a tool, but gradually became its master.

In other words, many believe that mathematics is capable of generating physics, while the opposite is true.

Fixing quantum mechanics isn't complex, but it is difficult and time-consuming [13,14,15,26,27].

First, we need to redefine spacetime as a matrix, such that time t consists of three components: txx, tyy, and ttt, and that time t is contained within and perpendicular to the three Euclidean axes: x, y, and z.

Secondly, assuming the existence of the Schrödinger partial differential equation and its operation in infinite free space, the vacuum and energy density within it must be precisely redefined.

It should be noted that a vacuum can serve as an environment for all kinds of energy density, such as classical and quantum physics, and even mathematics in general.

Third, We must accept the following equation:

Energy density × Curvature of spacetime = I... (1)

in the form of a unified four-dimensional matrix, as a universal law of physics.

The precision and importance of Equation 1 are beyond imagination:

a) It unifies classical and quantum mechanics.

b) It unifies general and special relativity.

c) It can be used to define spacetime and to generate new physical and mathematical concepts.

d) It is used to judge the validity of any other time-dependent equation in a four-dimensional unitary time-space xt.

In other words, any physical or mathematical rule or law that agrees with Equation 1 must be accepted, and any physical or mathematical rule or law that does not agree with it must be refuted.

The question arises:

Is the time assumption t = ict the most disastrous assumption in the history of physics and mathematics?

Yes,

We assume t = ict.

This leads to:

Minkowski's hyperspacetime geometry:

$x^2 + y^2 + z^2 - c^2t^2 = s^2$ ... (2)

is the most disastrous assumption in the history of physics and mathematics.

Equation 2, which forms the basis of Minkowski's hyperspacetime geometry, must be replaced by the correct generalized Pythagorean equation derived from the transition chains of matrix B:

$x^2 + y^2 + z^2 + c^2t^2 = s^2$ ... (3)

Equation 3 is the correct extension of the Pythagorean theorem to a unified four-dimensional xt spacetime.

Schrödinger's secret, or what is known as his magic, lies in the following:

[The square root of a partial differential equation is another partial differential equation.][1,21,22]

Therefore, he calculated the square root of the partial differential equation for thermal diffusion and applied it to an infinite free space with an imaginary diffusion coefficient.

Hereafter is the response of Google and Wikipedia AI which we publish without comment!?

[The assumption t = ict

(where i) is the imaginary unit, (c) is the speed of light, and (t) is time) is not a disastrous assumption; rather, it was a brilliantly successful, albeit limited, mathematical bridge. Far from being a historical blunder, it served as the critical stepping stone to modern theoretical physics.

1. The Purpose of t = ict

Introduced by mathematician Hermann Minkowski in 1908 to formalize Albert Einstein's Special Theory of Relativity, the assumption was designed to unify the three dimensions of space and the one dimension of time into a single four-dimensional continuum.

In classical physics, the distance between two points (the Pythagorean theorem) is:

(s^2 = x^2 + y^2 + z^2)

In relativity, to account for how space and time intertwine at high speeds, the spacetime interval requires a minus sign:

(s^2 = x^2 + y^2 + z^2 - c^2t^2)

By substituting (ict) for (t) (and consequently ((ict)^2 = -c^2t^2), Minkowski was able to express the interval as a standard sum of squares:

s^2 = x^2 + y^2 + z^2 + (ict)^2

This allowed physicists to treat time mathematically like a regular spatial dimension, which vastly simplified the equations for electromagnetism and kinematics.

2. Why It Is Viewed Critically Today

Modern physicists generally avoid using (t = ict) because it creates more conceptual problems than it solves. Its main limitations include:

The "Imaginary" Misconception: Time is inherently a real, physical variable; there is no physical dimension where time flows as an imaginary number.

Invalid for General Relativity: The \(ict\) trick only works for flat, unchanging space in special relativity. When you move to general relativity—which accounts for gravity and curved spacetime—this algebraic trick fails completely.

Confusion with Anti-Hermitian Operators: In quantum mechanics, using imaginary numbers for time often mixes up physical probabilities with spatial translations.

3. The Modern Solution

Today, physicists discard the \(ict\) assumption and instead use the mathematical framework of differential geometry and tensors. Instead of relying on imaginary numbers to get a minus sign in their equations, they define a "metric tensor" (specifically, the Minkowski metric) which explicitly encodes the signature of spacetime as \((-, +, +, +)\) or \((+, -, -, -)\). This achieves the exact same mathematical requirement without needing to make time an imaginary quantity.

4. Actual "Disastrous" Assumptions in Physics

Compared to the \(ict\) shortcut, true conceptual disasters in the history of science that genuinely stalled progress included:

The Aether: Assuming space was filled with a rigid, invisible medium (the luminiferous aether) through which light traveled. This dead-end theory required increasingly absurd mathematical gymnastics to survive until the Michelson-Morley experiments and Einstein disproved it.

Phlogiston: The assumption that a fire-like element called phlogiston was contained within combustible bodies and released during burning. This held back the correct understanding of oxidation for decades.

The (ict) assumption was never a disaster; it was a pragmatic, mathematically sound stepping-stone that helped Einstein and Minkowski shape our modern understanding of the universe. [1, 2]]

[[Time, as the fourth dimension, can have multiple definitions, interpretations, and calculations depending on the subject and the individual's perspective.

Time should not have a single definition, interpretation, or calculation applicable throughout the universe.]]

In other words, is time determined by whims these days?![16,17,18,19,20]

In the next section, "Numerical Theory and Applications," we will analyze and answer five important and pressing questions:

1. What is the problem of the Schrödinger partial differential equation?

2. What is the problem of Einstein's special relativity?

3. What is the problem of Einstein's general relativity?

4. What is the correct interpretation of the Schrödinger partial differential equation?

5-How to derive Sabines formula for reverberation time RT in audio rooms?

To avoid getting bogged down in the introduction, let's move directly to the second section, "Numerical Theory and Applications."

II.Numerical Theory and Applications

Q1-

What is the problem with the Schrödinger partial differential equation?

A1-

The two main flaws of the classical Schrödinger partial differential equation of 1927 are:

1. This theory fails to be consistent with general relativity or any other physical or mathematical theory, or to describe the nature of our universe.

2. The classical Schrödinger partial differential equation of 1927 is not invariant under relativity.

The following question arises:

Does replacing the 1927 Schrödinger partial differential equation with its quadratic form accurately correct errors 1 and 2?

The striking answer is yes, and this is another important topic for this article in New Physics [18,19,26,27].

Q2-

What is the problem with Einstein special relativity in 1905?

A2-

i-Attempting to prove the universal laws of physics: 1. The author believes that Einstein attempted to prove the Lorentz transformation law through a thought experiment within the framework of his original theory of special relativity in 1905.

However, this law is a general physical law and therefore cannot be proven or demonstrated.

The Lorentz transformation law in one dimension can be interpreted as the conservation of four-dimensional unit space x-t during motion, i.e.:

$x\ t = x^*t^*$ . . . . (4)

Equation 4, in itself, encapsulates the special theory of relativity in a single sentence!

The constancy of the speed of light (c) is not a general physical law, but the constancy of its square (c^2) is.

c^2 represents the general mass-energy conversion constant: $E = mc^2$... (5)

The constancy of the square of the speed of light (c^2) implies the constancy of the speed of light (c), not the other way around. This allows us to simplify the basic concepts of the theory without resorting to unnecessary assumptions.

ii- Redundant Assumptions:

Einstein used five assumptions in his 1905 paper on special relativity, describing them as irreducible.

However, the authors have shown that these can be reduced to just three assumptions in an exact algebraic derivation of Einstein's special theory of relativity [8,12,28].

iii- The Incomplete Mathematical Space:

The authors argue that the standard mathematical space used in general relativity (Riemannian space) is incomplete and misleading, describing it as a "diabolical trap" into which Einstein fell.

We propose an alternative numerical statistical theory in a real unitary space x-t, called the Cairo technique, and use its statistical series from a B matrix as a superior method for justifying aspects

not only of relativity but of virtually all laws of physics and mathematics.

iv - Separation of the Theories of Relativity:

In 1905, Einstein proposed his special theory of relativity for two frames of reference moving in a straight line at a constant speed relative to each other. In other words, the acceleration is zero.

Ten years later, in 1915, he proposed his general theory of relativity for two frames of reference moving with any acceleration relative to each other. This proposal is obviously illogical, since special relativity is simply a special case of general relativity obtained by making the acceleration zero.

Einstein was unable to prove this simple fact, and the two theories remained distinct.

Q3-

What is the problem of Einstein's general relativity?

A3-

Similar to special relativity, Einstein attempted to prove his general theory of relativity through another dubious thought experiment, leading to a disastrous conclusion:

Gravity is simply a consequence of the curvature of spacetime.

But the truth is that general relativity is simply the Lorentz transformation in four-dimensional unit space xyzt, interpreted as:

[force density or energy density matrix/tensor F] × [curvature matrix/tensor C] = I,

where I is the unit matrix.

This is a universal law of physics (Equation 1), and therefore cannot be proven.

This observation reduces the derivation of general relativity to a single sentence:

Q4-

What is the correct interpretation of the Schrödinger partial differential equation?

A4-

We assume that the only correct interpretation of the Schrödinger partial differential equation is that it is the square root of the corresponding partial differential heat diffusion equation in one, two, and three dimensions, for the same geometry and Dirichlet boundary conditions.

Note the following:

a) A solution to the partial differential heat diffusion equation for the same geometry and Dirichlet boundary conditions may or may not exist.

b) Even if a solution to the partial differential heat diffusion equation for the same geometry and Dirichlet boundary conditions does exist, it may or may not have a square root.

N. Bohr once stated that anyone who claims to understand the Schrödinger partial differential equation using Bohr's interpretations is either lying or completely ignorant.

The above statement applies to E. Shrodinger and N. Bohr as well.

The solution to the Schrödinger partial differential equation is the square root of the solution to the heat diffusion equation and is valid for one-dimensional, two-dimensional and three-dimensional Euclidean geometry, as shown in Figures 1 and 2.

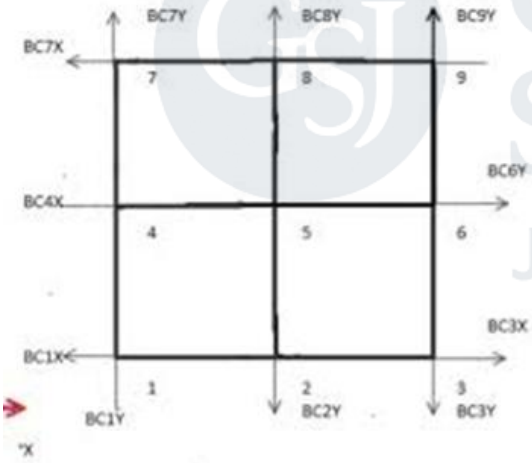

Figure 1 is a two-dimensional representation of the shape, with 9 equally spaced free nodes of matrix B in classical physics.

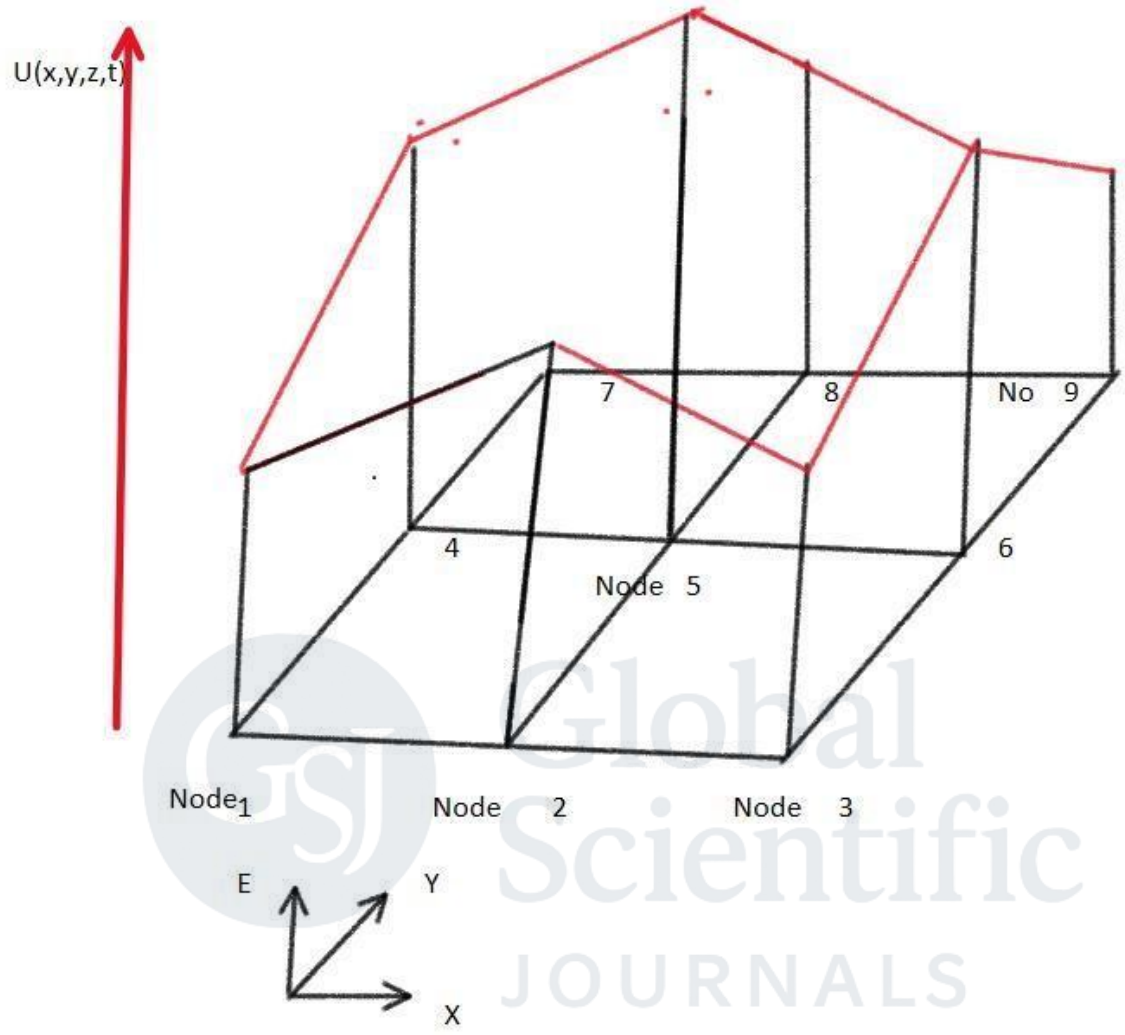

Figure 2 is a two-dimensional representation of the shape, with 9 equally spaced free nodes valid for the Q matrix in quantum physics.

Q5-

How to derive Sabines formula for reverberation time RT in audio rooms?

A5-

This question is particularly surprising for the following reasons:

a-Sabine's equation for calculating acoustic reverberation time (RT) in acoustic chambers:

has remained the basic equation for calculating acoustic echo time for the past hundred years and to this day.

b. This is explained in detail in references 23 and 24, as shown in Figure 3 below.

TR = 53.46 Volume of sound / Speed of sound * Area of interior walls * Sav, ... seconds. (5)

Where Sav is the average absorption of sound waves on the interior walls.

C. The study conducted by the researchers shows that the derivation of Sabin's formula for calculating the frequency time (RT) in acoustic chambers relies on a statistical assumption.:

Lav = 6V/4A ... (6)

where Lav is the average distance between two successive collisions of sound waves on interior walls.

Sabin Reflection Time (RT) in Acoustic Chambers

However, detailed statistical calculations performed by the authors show that Equation 6 is only an acceptable approximation of the value of Lav.

The exact formula is:

Lav = 2πV/4A ... (7)

which corrects the 6 in Equation 6 to 6.28 in Equation 7.Nature is statistically symmetrical and finite.

III- Conclusion

Nature's creations exhibit a wide range of symmetry, from the intricate patterns of snowflakes to the streamlined bodies of sharks. Every physical or mathematical problem has a natural statistical solution that operates within a suitable, finite control range, which is itself the theory of Cairo Techniques in statistical mechanics. We emphasize that Abbas's statistical mechanics, based on the statistical transition matrix B, is entirely new physics, distinct from Heisenberg's transition matrix, which is neither statistical nor a transition matrix.

The above fact was the core of the previous articles entitled "How to Generate New Mathematics - Parts 1, 2, 3, 4, 5, and 6."in addition to Can we think outside thebox and How to Merge Quantum mechanics in General Relativity in addition to New Physics and Quantum Mechanics.

In this article, we have presented and analyzed five important and pressing questions:

1. What is the problem of the Schrödinger partial differential equation?

2. What is the problem of Einstein's special relativity?

3. What is the problem of Einstein's general relativity?

4. What is the correct interpretation of the Schrödinger partial differential equation?

5-How to derive Sabine’s formula for reverberation time RT in audio rooms?

Thanks to the statistical theory of B-matrix chains a product ofCairo techniques the numerical answer to all the above questions extremely accurate

and furthermore new rules and theorems have been generated.Note that in this article we completely ignore Schrodingers theoryof QM and Einstein theory of gravity or GR as if they never existed.

The Matrix mechanics of Cairo techniques is our new mechanics choice.

We assume that the statistical transition B-matrix chains which combines the universal laws of continuity of total energy, Phythagaras, and Einstein curvature among others is the only valid statistical mechanics and that any trial to generate equivalent one is doomed to fail.

Note: The authors use their own dual-precision algorithm, such as the one in references 30, 31, 32, 33 and 34.

No FDM techniques, no ready-to-use Python or MATLAB algorithms are needed.

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