What Do You Know About electromagnetic theory?

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Abstract

[Ismail Abbas [1,4] proposes a reformulation of quantum mechanics and classical physics using Cairo techniques, bounded statistical systems, and novel mathematical frameworks to uncover hidden laws in classical and quantum physics.

Overview of Abbas's Approach

Ismail Abbas, a PhD lecturer at Cairo University, has developed a series of theoretical frameworks aimed at addressing perceived limitations in classical and quantum physics

His work emphasizes that traditional mathematics has been used as a tool in physics but should not be assumed to generate new physical laws; instead, he argues that physics can reveal new mathematics through statistical and unitary approaches .

Key Concepts in Abbas's New Physics

1. Bounded Statistical Systems: Abbas introduces the concept of a bounded statistical system, defined as a closed control volume with Dirichlet boundary conditions. This framework is applied to both classical and quantum systems, providing constraints that help resolve paradoxes such as Schrödinger's cat by accounting for information loss in open systems .

2. **Cairo Techniques:** This is a 4D unitary numerical statistical method that Abbas uses to reformulate classical and quantum mechanics. It involves transition chains and B-Transition Matrices to correct

incomplete or misleading aspects of the Schrödinger equation, allowing for a more precise description of quantum energy distributions .

3. **Reformulation of the Schrödinger Equation:** Abbas proposes squaring the Schrödinger PDE to represent the quantum energy density as a real quantity, $\Psi^2 = \Psi \cdot \Psi^*$, which provides a clearer statistical interpretation of quantum states and energy distributions

4. Integration with General Relativity: His work also explores merging quantum mechanics with general relativity within bounded volumes, suggesting that electromagnetic and gravitational fields can be reformulated to align with quantum principles, potentially leading to a unified framework .

5- Reformulation or modification of the four Maxwell equations in integral or differential which form are the foundation of electromagnetic theory.

Ismail Abbas, a PhD lecturer at Cairo UnivThe authors assume that the classical four Maxwell equations are now too old and needs to be reformoulated in the unified frame of the new physics space-time to conform with modern classical and quantum physics. ersity, has developed a series of theoretical frameworks aimed at addressing perceived limitations in classical and quantum physics

In fact this was the last ideas of A. Einstein but his limited resolving power and limited knowledge at the time of no digital computers could not help.

6. Discovery of Hidden Laws: Abbas et al claim that tens of intrinsic laws and rules in electromagnetic field theory, remain undiscovered. Whereas the B-matrix chains methods can systematically uncover these hidden patterns using statistical and unitary approaches.

Implications

Abbas's contributions are primarily theoretical and focus on providing a new mathematical and physical lens to understand quantum phenomena, energy distributions, and the interplay between classical and relativistic physics. His work challenges conventional assumptions and proposes alternative formulations that could refine or extend current models in physics.

In summary, Ismail Abbas's "new physics" revolves around bounded statistical systems, Cairo techniques, and reformulated quantum mechanics, aiming to reveal hidden laws and improve the precision of physical theories.]

We all know that the 4 Maxwell equations entered physics in 1861 merely to explain the propagation of emw in vacuum or ether whereas the authors believe that the reformulated 4 Clarck Maxwell equations in the frame of new physics can reveal more many hidden intrinsic rules.

The principle of symmetry in physics is not only a fundamental concept but also a test of the validity of physical laws. Symmetry implies that the laws of physics remain unchanged under certain transformations, such as rotations, translations, or reflections. This principle is crucial for understanding the behaviour of physical systems and the interactions between particles and forces.

In early 2020 we introduced explained and solved the Laplace PDE and Poisson PDE in the proposed closed control vokume [10] without the need for the classical 4 Maxwell equation as if they never existed.

Another clear example is that the common belief derived from Maxwell's four classical equations, which states that no magnetic monopole exists, is actually wrong. On the other hand, modern physics suggests that electric and magnetic fields are two sides of the same coin. So, a magnetic monopole might actually exist.

Unexpectedly, this new physics formulation increases the amount of information and can be used to generate a new rules and laws in the field of physics and mathematics as well as the electromagnetic theory

The real answer to the article title question is that most people know almost nothing about the true rules and laws in the field of electromagnetic theory in a unified four-dimensional space-time, which participates in describing classical and quantum physics. That includes those researchers who have been indoctrinated via Minkowski, Einstein and Schrodinger's ideas about R^4 space and whom we regard as the source of all evil.

In this article, we extend the same techniques from the new B and Q statistical transition matrix chains resulting from the statistical theory of Cairo's techniques, sometimes called new physics, to introduce, explain, and answer the following ten important and pressing questions:

1-What are the fundamental forces in EM or QM system?

2-What is time complexity?

3-Do we need the classical four Maxwell simultaneous PDE?

4-Can waves interact with one another?

5-Is it true that diffusion in vacuum exist?

6-Is it time to replace the vector space with the matrix space?

7-Is it true that the physical information is not yet well defined?

8-Is it true that Bohr correspondence principle in QM is stolen?

9-Det(A) . det(B) = det(A.B) is this a universal law of physics?

10-Is the square of E and H quantized?

Finally, it is important to note that this article does not aim to diminish the significant contributions of great physicists and

mathematicians such as A. Einstein, C. Maxwell, E. Schrödinger, N. Bohr, E. Heisenberg, Minkowski, Hilbert, Riemann, among 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, please stop reading. This article is not intended for you.

I.A comprehensive introduction including theory and numerical results

[Ismail Abbas [1] proposes a reformulation of quantum mechanics and physics using Cairo techniques, bounded statistical systems, and novel mathematical frameworks to uncover hidden laws in classical and quantum physics.

Overview of Abbas's Approach

Ismail Abbas, a PhD lecturer at Cairo University, has developed a series of theoretical frameworks aimed at addressing perceived limitations in classical and quantum physics

His work emphasizes that traditional mathematics has been used as a tool in physics but should not be assumed to generate new physical laws; instead, he argues that physics can reveal new mathematics and physical rule and laws through statistical and unitary space approaches .

Key Concepts in Abbas's New Physics

Bounded Statistical Systems:

Abbas introduces the concept of a bounded statistical system, defined as a closed control volume with Dirichlet boundary conditions [2,3.4,5,6].

This framework is applied to both classical and quantum systems, providing constraints that help resolve paradoxes such as Schrödinger's cat by accounting for information loss in open systems.

2. Cairo Techniques: This is a 4D unitary numerical statistical method that Abbas proposes to reformulate quantum mechanics. It involves transition chains and B-Transition Matrices to correct incomplete or misleading aspects of the Schrödinger equation, allowing for a more precise description of quantum energy distributions .

3. Reformulation of the Schrödinger Equation: Abbas proposes squaring the Schrödinger PDE to represent the quantum energy density as a real quantity, $\Psi^2 = \Psi \bullet \Psi^*$, which provides a clearer statistical interpretation of quantum states and energy distributions [7,8,9,10,11,12,13,14,15,16,17,18].

4. Integration with General Relativity:

His work also explores merging quantum mechanics with general relativity within bounded volumes, suggesting that electromagnetic and gravitational fields can be reformulated to align with quantum principles, potentially leading to a unified framework [27,28].

5. Discovery of Hidden Laws [5,19,21]:

Abbas claims that thousands of intrinsic laws and rules in physics, mathematics, and biochemistry remain

undiscovered. His methods aim to systematically uncover these hidden patterns using statistical and unitary approaches .

Implications

Abbas's contributions are both theoretical and experimental [31,32,33] and focus on providing a new mathematical and physical lens to understand quantum phenomena, energy distributions, and the interplay between classical and relativistic physics. His work challenges conventional assumptions and proposes alternative formulations that could refine or extend current models in physics.

In summary

Ismail Abbas's "new physics" revolves around bounded statistical systems, Cairo techniques, and reformulated quantum mechanics, aiming to reveal hidden laws and improve the precision of physical theories **][1].**

We all know that mathematics entered physics as a tool, but gradually it turned into the master of physics.

In the sense that, the majority of scientists think that mathematics can generate physics, when in fact it's the other way around.

This is the subject of the present article.

Along the last century, we call it century of agony, false attitude of many mathematicians argue that geometry (which was always the rigorous base for physics and mathematics) belong to mathematics not physics since the time of the ancient Greek philosopher Plato, the physicist Galileo Galilei and even Archimedes which is not true.

The most striking example is the current belief that the non-comprehensible, and sometimes misleading four classical Maxwell PDE in R^4 time space which serves to describe the EMW propagation in infinite vacuum and rarely nothing else.

That is the reason why we propose rewriting four classical Maxwell PDE in the new physical space which is the unitary 4D xt closed control volume in the same way we have done for classical Schrodinger PDE in terms of Ψ^2 rather than the wave function Ψ it self.

In other words we need to know what happens when we rewrite four classical Maxwell PDE in 4D not in classic 3D+1 which implies rewriting Maxwell PDE in E^2 and H^2 not in E and H.

Note that:

i-E^2 and H^2 multiplied (ε) and (μ) constants are real energy density quantities U(x,y,z,t) that belongs to precise physical space geometry which is more realistic and more efficient.

ii-The E^2 and H^2 can be described in matrix space (unitary 4D xt space where time axis is woven in the other 3 other geometric Cartesian axes x, y, z and in the same time perpendicular to all of them) not in the D^4 classic vector space (3 geometric axix x,y,z where time is treated as external scalar controller).

iii-**This process is** almost identical to the process of squaring the classical Schrodinger PDE in 1927 describing the complex wave function Ψ to in R^4 vector space (suggest by the same authors) and consequently Ψ is to be replaced by its square Ψ^2 = Ψ•Ψ* introduced by thw authors in 2022 [34].

These three elements i, ii, iii are the topic of this article.

To get back to a real answer to the question in the article's title, we state with certainty that most people know nothing about the true electromagnetic theory in a unified four-dimensional space-time,

which is essential for describing classical and quantum physics as well as E and H in matrix form.

We recall that In the four previous articles entitled 'What Do You Know About Quantum Mechanics? – Parts One, Two, Three and four' we presented, explained, and answered efficiently and rigorously more than 20 important and pressing questions in the field of modern (or new) quantum physics — sometimes called 'Abbas physics' to set it apart.

In this article, we extend the same techniques resulting from the new B and Q statistical transition matrix chains obtained from Cairo's techniques, called new physics, to introduce, explain, and answer the following ten questions, which are more complex and more advanced:

1-What are the fundamental forces in EM or QM system?

2-What is time complexity?

3-Do we need the classical four Maxwell simultaneous PDE?

4-How do waves interact with one another?

5-Is it true that diffusion in vacuum exist?

6-Is it time to replace the vector space with the matrix space?

7-Is it true that the physical information is not yet well defined?

8-Is it true that Bohr correspondence principle in QM is stolen?

9-Det(A) . det(B) = det(A.B) is this a universal law of physics?

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Finally and again 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, Bohr, 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, please stop reading. This article is not intended for you.

Our choice is statistical mechanics.

Moreover, the statistical mechanics we propose isn't entirely new and has been successfully and effectively applied to many areas of classical and quantum physics as well as in applied mathematics and probability and statistics since 2020.

In other words, the authors statistical mechanics is based on statistical transition matrix chains (B-matrices chains), which have been precisely defined and efficiently working active since 2020 (2,3,4,10-13,19)

That is the reason behind our choice which is statistical mechanics inside closed control volume bounded by Dirichlet boundary conditions and based on the transition B-matrix chains resulting from Cairo techniques.

Note that today we know only two types of transition matrix chains, namely Markov transition matrix chains M and the Author proposed B-matrix chains where the superiority of the latter is evident [26].

Note also that the well known Heisenberg quantum transfer matrix is neither transition nor statistical matrix.

The far success of the B-matrix chains is partly due to exact definition of time t for the first time in history as satisfying the following physical and geometrical conditions [Note that we mean new geometrical physics not classical geometry in a sense]:

1- Satisfies the generalized time-dependent Pythagorean theory:

X^2 + y^2 + z^2 + C^2t^2 = hypotenuse^2 = constant... (1)

And not the catastrophic anti-Pythagorean definition of Einstein and Minkowski

X^2 + y^2 + z^2 - C^2t^2 = 0... (2)

However, since Einstein and Minkowski adopted the false concept of equation 2, it became the standard.

2- We define Time t as the fourth Cartizian axis which is not separate from the other three geometric axes x,y,z like a separate scalar controller, but is rather intertwined with the other three geometric axes and at the same time perpendicular to all of them.

3-Time is discrete not continuous, which means it is quantized and not continuous [25]

This discretization of time is more general and replaces the Bohr quantization of angular momentum :

m v 2 Pi r = nh, n = 1, 2, 3, ... infinity.. . . (3)

4- The discretization of time is performed as [20,21,25,26].

t=Ndt where N is the number of iterations or time step and dt is the time jump.

This is the source for the expression for the transfer matrix D(N) after time Ndt as,

$D(n)= B + B^2 + B^3 + ... + B^N$ . . . (4)

Which reduced to,

D(N) = E(N)-I

Where I is the unit matrix nxn and,

E(N)= 1 / (I-B) for sufficiently large N.

Now, we can define the quantum transition matrix Q as,

Q=SQRT (B) . . . (5)

And the transfer quantum transfer matrix,

D(Q) via the expression,

$D(Q)= Q + Q^2 + Q^3 + ... + Q^N$ . . . (6)

Which reduces to,

D(Q)= = 1 / (I-Q) when N is sufficiently large.

And what is even more surprising is that (19),

D(N) = SQRT (E(N)) in all cases for all numerical values of RO element of [0,1].

It is worth noting that Equation (2.3,4,5,6) **unifies—in a sense—classical physics and quantum physics** and surprisingly general relativity as well.

The statistical transition B-matrix in 1D,2D,3D itself is uniquely and well defined inside the closed control volume with Dirichlet boundary conditions(may be called Abbas control volume for distinction) through the following 4 statistical conditions [14,15,18,19].

The entries B i, j comply with or are subject to the following 4conditions for 2 D situations:

i-B i, j = 1/4 for i adjacent to j .. and B i, j = 0 otherwise. This means that the prior probability is equal.

ii- B i, i = RO, i.e. the main diagonal is made up of constant inputs RO. For example in the heat diffusion equation, RO can take any value in the closed interval [0,1]while for Laplace and Poisson PDE, RO = 0. That is to say that B is a null principal diagonal matrix which corresponds to the assumption of a null residue after each time step for all over the free nodes.

iii- B i, j = B j, i, for all i, j.The matrix B is double symmetrical to conform to the physical principle of detailed balance.

iv- The sum of B i, j = 1 for all the rows far from the borders and the sum B i, j <1 for all the rows connected to the borders meaning that the probability of the whole space = 1.

Obviously, the statistical matrix B is very different from the Laplacian mathematical matrix A and from the Markov transition matrix M.

The physical nature of B is clear and briefly explained above through conditions I to iv which support hypothesis 3.

The complexities related to determining the B matrix in classical physics and the Q matrix in quantum physics emerge from the process of pre-selecting the main diagonal elements (Bii or RO), since this arbitrary choice uniquely determines the nature of the problem and its physical characteristics.

For example:

i- Bii = 0 for mathematical and electromagnetic problems.

ii- Bii = 0.2 and 0.22 for the partial differential equation (PDE) governing heat diffusion in low-alloy steel and high-quality Egyptian aluminum, respectively. And so on.

We now return to the NEW properties and theorems derived from the statistical mechanics of quantum systems in the new physics—insights that could not have been reached via the classical Schrödinger equation (the partial differential equation) introduced in 1927.

A simple approach to understand the new physics and mathematics inherent in the electromagnetic theory and in the new physics as a whole, is the Cauchi-Riemann stress strain tensor:

the Cauchi-Riemann stress-strain tensor in 3D geometric space xyz is expressed as,

Fxx Fxy Fxz

Fyx Fyy Fyz

Fzx Fzy Fzz

We call it matrix/tensor M1

And the corresponding strain tensor we call it space curvature tensor (We denote it by matrix or tensor M2)

Then M1 x M2 =modulus of elasticity

What we contribute here is in fact new physics which comprises time as the forth cartisian dimension and can be introduced and explained as follows:

1-The first fantastic breakthrough here consists of transforming the Cauchy-Rieman stress tensor into an energy density tensor U(x,y,z,t) Jm-3 sec in the form of a Laplacian stress matrix:

∇^2xx ∇^2xy ∇^2xz ∇^2xt]U(x,y,z,t)

∇^2yx ∇^2yy ∇^2yz ∇^2yt]U(x,y,z,t)

∇^2zx ∇^2zy ∇^2zz ∇^2zt]U(x,y,z,t)

∇^2tx ∇^2ty ∇^2tz ∇^2tt]U(x,y,z,t)

We call it matrix stress tensor M3.

Where,

∇^2xx = d/d2 (partial) and ∇^2xy = d/d2(partial) x y and so on.

2- And the second fantastic breakthrough consists, in the same way, of transforming or generalizing Cauchy's 3D geometric deformation tensor into a 4D xyzt spacetime curvature, namely:

∇^2xx ∇^2xy ∇^2xz ∇^2xt

∇^2yx ∇^2yy ∇^2yz ∇^2yt

∇^2zx ∇^2zy ∇^2zz ∇^2zt

∇^2tx ∇^2ty ∇^2tz ∇^2tt

We call it the M4 matrix or tensor of spacetime curvature.

3-The third and greatest fantastic and consistent advance is to reasonably assume that **[2-32]:**

Energy density Stress Tensor M3 × Spacetime curvature tensor M4 = I ...(7)

Where I the identity matrix .

Most important is that eq 7 is a universal law of physics that applies to all kinds of energy density (quantum energy density, emw energy density , sound waves energy density . . and so on) and not exclusively to gravity energy density as Einstein erroneously assumed in his general relativity in 1915.

It should be noted that the statistical sequences of the 'B matrix' do not depend on the classical 4 Maxwell PDE formulated in late nineteenth century or any other PDE. Consequently we propose replacing the classical Maxwell PDE equations with its quadratic form describing $E^2$and H^2. It is also worth noting that the later forms aligns with space-time symmetry and the general physical law: U(x, y, z, t) . Spacetime curvature = I . . . (7*) Whereas classical partial differential equation itself does not satisfy these conditions. All analyses presented in this research paper—as well as in previous papers dating back to 2020—apply to the squared formulation, not to the conventional PDE equation. Thus, we disregard the four conventional Maxwell PDE equation as if they never existed, and restrict ourselves to the squared formulation. Note that squared formulation implies,

1-Both statistical transition matrices, B and Q, must be simultaneously "double statistical," singular (meaning their determinants are zero), and meanwhile invertible.

2- Both statistical transfer matrices, D and D(Q), must be simultaneously "double statistical," singular, and invertible.

Statement (1,2) above appears contradictory, yet there is a justification for it, as follows:

The classical SE lives and operates in infinite void, which constitutes 99.9 % of our universe.

In fact, the vacuum is not a void in the true sense; rather, it is in reality a substance teeming with energy densities—whether potential or kinetic.

3- It follows that the flow of the energy density distribution in quantum mechanical system must be an inverse flow (negative diffusion);that is, it extends from the system's walls toward its internal centre of mass (CM).

4- It follows from conditions 1 ,2 and 3 that the energy density in quantum mechanical system must be geometrically triangular, as shown in Figures 1 , 2 and 3.

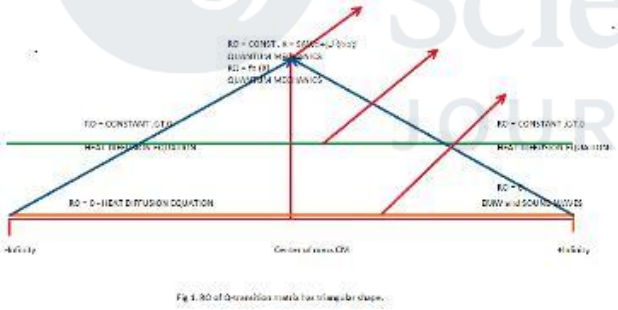

Figure 1: A one-dimensional quantum mechanical model consisting of n free nodes separated by equal distances;the triangulation is obvious.

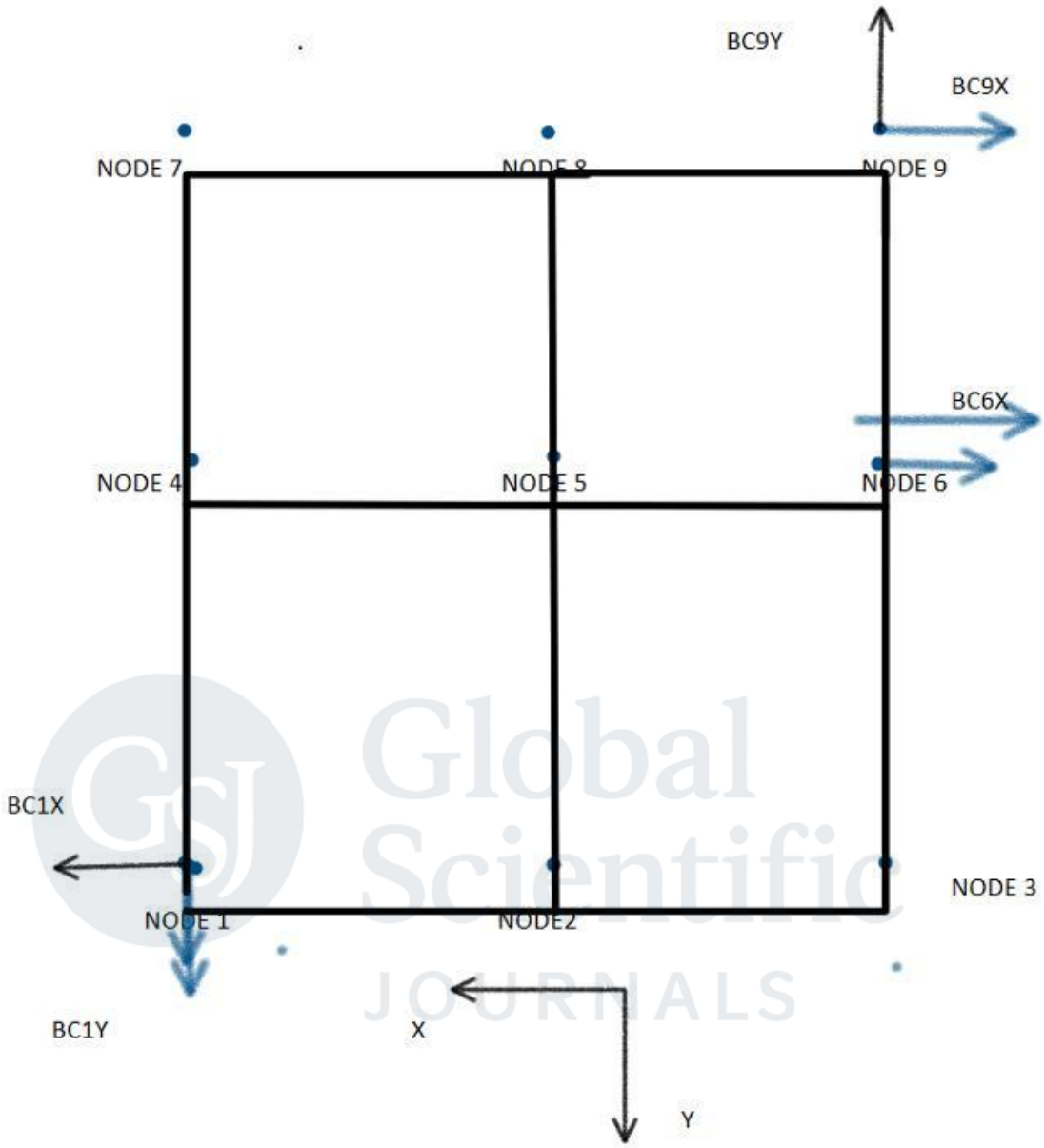

Figure 2: A 2D rectangle composed of equidistant 9 free nodes spaced at equal intervals in classical physics—without

triangulation.

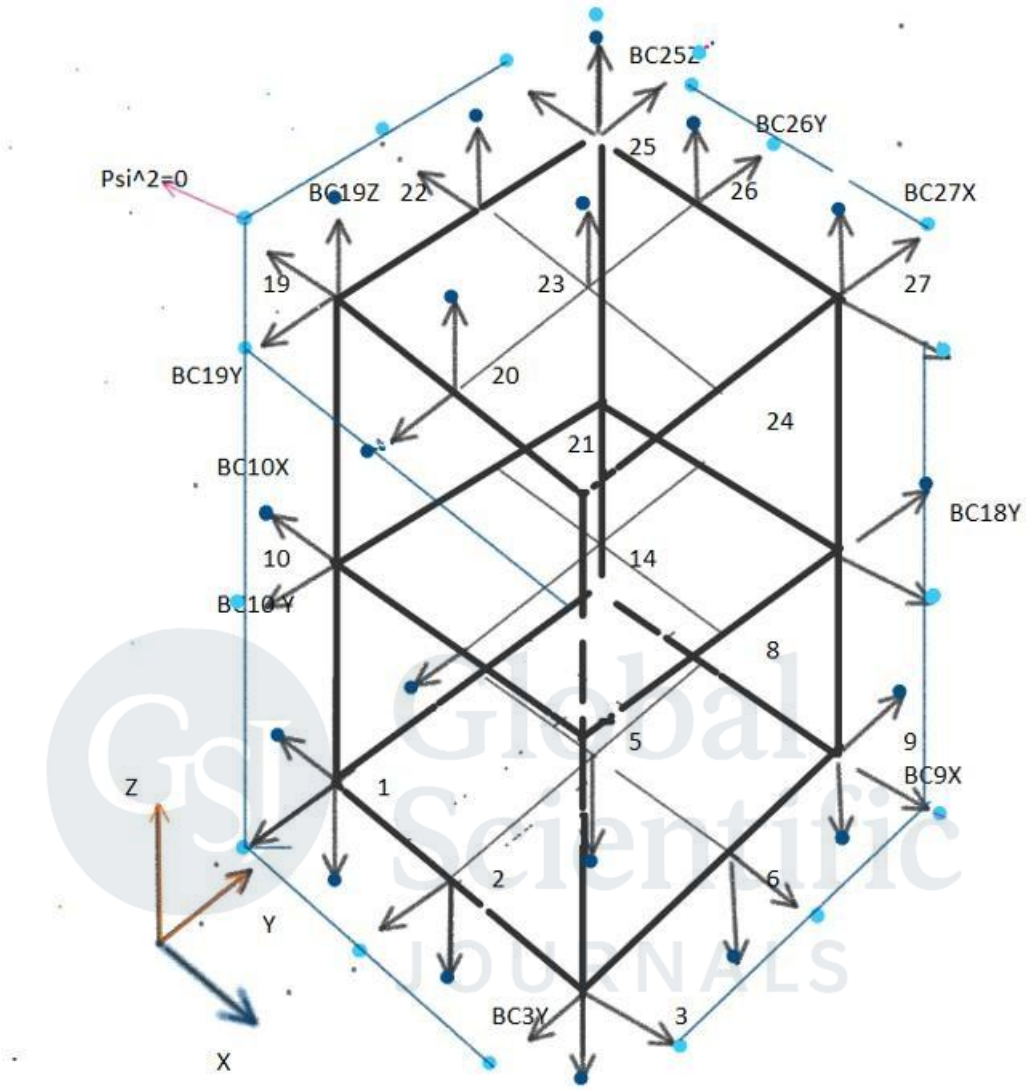

Fig. 3 -3D classical or quantum system-Triangularization process is shown here.

Triangularization with its peak at the vertex CM process appears in electromagnetic energy systems as well as in Quantum mechanical systems when both of them lives and operates in infinite vacuum inside the closed control volume box where the boundary conditions at infinity must be bounded to zero.

In other words, in electromagnetic energy system and Quantum mechanical system which lives and operates in infinite vacuum

where the boundary conditions at infinity must be bounded to zero, both of them should have Its transition matrix B and transfer matrix D determinents equal to zero and meanwhile invertible.

The question arises how and why?

The answer is simple:

The 2D transition matrix represents a solution to the following system of simultaneous homogeneous linear algebraic equations:

a11 x1 + a12 x1 + a13 x1 + ... = 0
a21 x2 + a22 x2 + a23 x3 + ... = 0
. . . . . .
an1 x1 + an2 x2 + an3 x3 + ... = 0
It is obvious that the above-mentioned system of homogeneous linear equations has a solution if and only if the determinant of the matrix:
a11 a12 a13
…. . . . .
an1 an2 ann ...
equals zero.
This is what was to be proved.,

Another question arises:

What is required to master the statistical theory of B-matrix chains—or any other equivalent statistical theory [Abbas and Professor S. Guorgeva p[34,35].

1-Comprehensive knowledge and understanding of universal classical and quantum laws and rules of physics[2-7,21,22,34,35].

2-Improved knowledge and understanding of how to construct correct and efficient software algorithms using current programming languages, such as Fortran and C++ [21,22,25,26,27,34,35].

3-Mastery of matrix algebra operations, such as calculating eigenvalues and eigenvectors, as well as matrix multiplication, addition, inversion, and others[29,30].

Moreover we finally explain through unitary 4D xt figures and shapes how we can increase the amount of information.

To avoid getting bogged down in the introduction, let's move directly to the second section,

II-Theory and Numerical Applications

Q1-

1-What are the fundamental forces in EM or QM system?

A1-

In accordance with Koga [11] we assume the following:

The fundamental forces or potentials V in QM system particle i are the following three [11-15]:

1- Force on QM system particle from internal field produced by the nearby particles themselves F1.

2- Force on QM system particle from external field applied on walls or Dirichlet Boundary conditions Vext or F2.

3-Force on QM system particle resulting from interacting with all other particles F3.

We assume that:

F1 equals 1/n . . . (8)

Consequently F1 is expressed in the later EM transition matrix main diagonal aii as 1/19.

Obviously, n is the total number of electromagnetic energy density nodes inside the unit 4D xyzt volume or the number of free nodes

in the control volume, not to be confused with N, the number of iterations or time steps.

F2 is defined by the applied external field Vext or boundary conditions on walls which follows normally inverse square law,

F2 = Const / r^2 . . . . . (9)

where r is the distance from the center of mass CM.

F3 =0 . . . . (10)

Equation 10 assumes reasonably and logically that F3 statistically sums up to zero inside electromagnetic box.

The quantum transition matrix Q is always defined as:

Q=SQRT(B)

We know that B is a double statistical matrix hence it is singular matrix and consequently it clearly seems that the quantum transition matrix Q exists but hard to be found.

However, there is a geniuos approach to compute rigorously all the elements of the quantum transition matrix Q using the relations:

V=V1+V2 . . . . (11)

in the vacuum space for EM,

Where:

V1=Constant1 proportional to1/n

V2= Constant2 * Energy density U(x,y,z,t)

V2 (x,y,z,t) is proportional to U(x,y,z,t).

Here is the expression for 1D EM transition matrix Qi,j 19x19 for the case of 19 free nodes.

Q i,j 19x19=

1/2-(1/19+1/81)/2 1/19+1/81 1/2-(1/19+1/81)/2 0
0 0 0 0 0 0 0
0 0 0 0 0 0 0
0

0 1/2-(1/19+1/64)/2 1/19+1/64 1/2-(1/19+1/64)/2
0 0 0 0 0 0 0
0 0 0 0 0 0 0
0

0 0 1/2-(1/19+1/49)/2 1/19+1/49 1/2-
(1/19+1/49)/2 0 0 0 0 0
0 0 0 0 0 0 0
0 0

0 0 0 1/2-(1/19+1/36)/2 1/19+1/36
1/2-(1/19+1/36)/2 0 0 0 0
0 0 0 0 0 0 0
0 0

0 0 0 0 1/2-(1/19+1/25)/2
1/19+1/25 1/2-(1/19+1/25)/2 0 0 0
0 0 0 0 0 0 0
0 0

0 0 0 0 0 1/2-
(1/19+1/16)/2 1/19+1/16 1/2-(1/19+1/16)/2 0 0
0 0 0 0 0 0 0
0 0

0 0 0 0 0 0 1/2-
(1/19+1/9)/2 1/19+1/9 1/2-(1/19+1/9)/2 0 0
0 0 0 0 0 0 0
0

0 0 0 0 0 0
0 1/2-(1/19+1/4)/2 1/19+1/4 1/2-(1/19+1/4)/2 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 1/2-(1/19+1/1)/2 1/19+1/1 1/2-(1/19+1/1)/2 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1/2-(1/19+1/4)/2 1/19+1/4 1/2-(1/19+1/4)/2 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 1/2-(1/19+1/9)/2 1/19+1/9 1/2-(1/19+1/9)/2 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 1/2-(1/19+1/16)/2 1/19+1/16 1/2-(1/19+1/16)/2 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 1/2-(1/19+1/25)/2 1/19+1/25 1/2-(1/19+1/25)/2 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 1/2-(1/19+1/36)/2 1/19+1/36 1/2-(1/19+1/36)/2 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1/2-(1/19+1/49)/2 1/19+1/49 1/2-(1/19+1/49)/2 0 0

0 0 0 0 0 0
0 0 0 0 0 0 0
0 0 1/2-(1/19+1/64)/2 1/19+1/64 1/2-(1/19+1/64)/2
0

0 0 0 0 0 0
0 0 0 0 0 0 0
0 0 0 1/2-(1/19+1/81)/2 1/19+1/81 1/2-
(1/19+1/81)/2

0 0 0 0 0 0
0 0 0 0 0 0 0
0 0 0 0 1/2-(1/19+1/100)/2
1/19+1/100

Note that:

1-the matrix Q 19x19 is singular and mean while invertible.

2-Q * F(x)=F(x)

For almost all expressions of vector state whether linear, or Cx or Cx^2 or Cx^3 . . etc.

Which means that,

i-If F(x) state vector V=(1,1,, ... ,1,1)T

Then, Q*V==(1,1,, ... ,1,1)T

ii-If F(x) state vector follows inverse square law as in the case of first ten stationary states of Hydrogen atom,

V=

[17/125 68/405 17/80 68/245 17/45 68/125
17/20 68/45 17/5 68/5 17/5 68/45 17/20
68/125 17/45 68/245 17/80 68/405
17/125]T

The output result at vector for the first ten stationary states is exactly the same as Classical Bohr H-Atom shown in Fig.1. below.

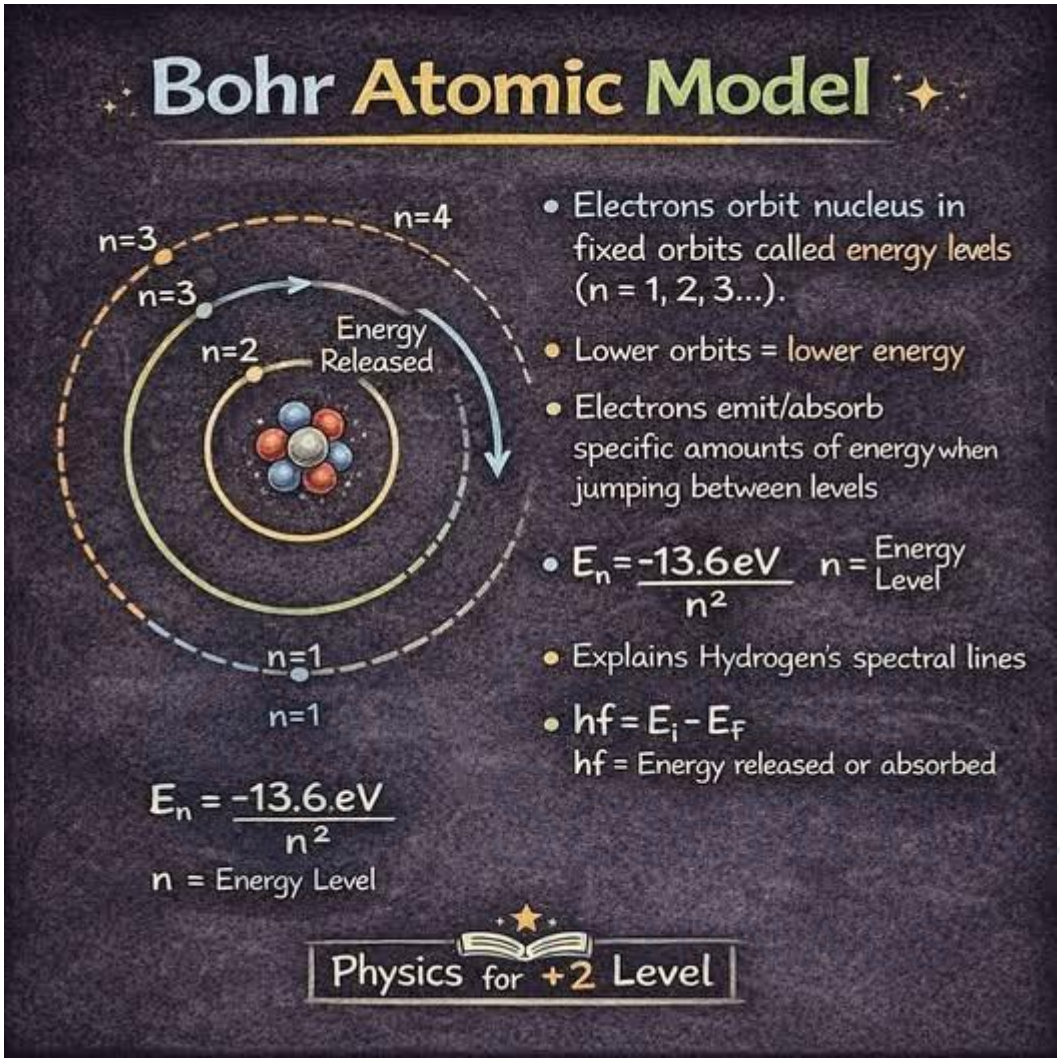

Fig.1 Classical Bohr Hydrogen atom stationary energy levels [1].

[17/125 68/405 17/80 68/245 17/45 68/125
17/20 68/45 17/5 68/5 17/5 68/45 17/20
68/125 17/45 68/245 17/80 68/405
17/125]T

iii- If the vector V is complex, like exp(ix), then we apply for complex V=

[e^1i ,e^2I,e^3i,e^4i,e^5i,e^6i,e^7i,e*8i,e^9i,e*10i,e^9i,e^10i,e^8i
e^7*i, e*6i,e^5*i e^4*ie^3*ie^2*ie^1*i] T

The output result is the same complex vector,

[e^1i ,e^2I,e^3i,e^4i,e^5i,e^6i,e^7i,e*8i,e^9i,e*10i,e^9i,e^10i,e^8i
e^7*i, e*6i,e^5*i e^4*ie^3*ie^2*ie^1*i] T

Q2-

2-What is time complexity?

A2-

Time complexity is of time the least understood subject in whole physics.

In fact the interpretation of time as imaginary external independent controller

t (complex) = i C t (t -real) . , . . (12)

where I is the complex unit vector and C the speed of light

is one of the most catastrophic assumptions in the history of physics and mathematics.

Just because physics and mathematics are still in the hands of science deniers.

The correct modelling of time is 4 components wound to 3D xyz geometric space, i.e.:

t=txx, txy, txz and tt [2-10]

and mean time is orthogonal to all of them in the sense that distance d between two nodes is defined as,

d^2=x^2+y^2+z^+C^2 t^2 . . . . (13)

Here time should be discrete and not continuous.

Discreteness in time results in probabilistic assumptions more general and replaces more efficiently discreteness in classical and quantum physics [11,12,13,14,15].

Q3-

Do we need the classical four Maxwell simultaneous PDE?

A3-

Definitely not.

We assume that the four Maxwell simultaneous PDE .

1-∇.E=ρ/ε .....Gauss Law

2-∇.H=0 .....There is no magnetic monopole.

3-∇xE=-μ dH/dt)partial .....Faraday Law

4-∇xH=-Jc +ε dE/dt)partial ....Modified Amperes circuital law

are now too old and should be replaced.

In fact this was the last ideas of A. Einstein but his limited resolving power and limited knowledge could not help.

We can rewrite the four Maxwell simultaneous PDE in their squares

In two consecutive steps.

Step 1

just as the case of rewriting this classical Schrodinger PDE SE in its square form,

We rewrite the four Maxwell simultaneous PDE .in their squares just as the case of rewriting this classical Schrodinger PDE SE in its square form,

d/dt) partial ε E^2= BC+S . , , . (14)

where BC and S are the boundary conditions and S is the source/sink term in Js^-1 respectively.

Step 2

We again rewrite equati9on 1 in matrix form,

∇^2xx ∇^2xy ∇^2xz ∇^2xt]U(x,y,z,t)

∇^2yx ∇^2yy ∇^2yz ∇^2yt]U(x,y,z,t)

∇^2zx ∇^2zy ∇^2zz ∇^2zt]U(x,y,z,t)

∇^2tx ∇^2ty ∇^2tz ∇^2tt]U(x,y,z,t)

which we call matrix M1

and the space-time curvature in matrix form as,

∇^2xx ∇^2xy ∇^2xz ∇^2xt

∇^2yx ∇^2yy ∇^2yz ∇^2yt

∇^2zx ∇^2zy ∇^2zz ∇^2zt

∇^2tx ∇^2ty ∇^2tz ∇^2tt

which we call matrix M2

Now applying the universal law of physics,

Energy density matrix x space-time curvature matrix = I

Where I is the unit matrix 4x4 ie M1 x M2 =I

The same expression applies exactly to magnetic field squared μH^2.

The principle of symmetry of EM energy density in M1 implies:

i- The electric and magnetic fields are two sides of the same coin.

ii- And/or a magnetic monopole exists.

We rewrite the four Maxwell simultaneous PDE .in their squares just as the case of rewriting this classical Schrodinger PDE SE in its square form,

d/dt) partial ε E^2= BC+S . , , . (15)

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∇^2tx ∇^2ty ∇^2tz ∇^2tt]U(x,y,z,t)

which we call matrix M1

and the space-time curvature in matrix form as,

∇^2xx ∇^2xy ∇^2xz ∇^2xt

∇^2yx ∇^2yy ∇^2yz ∇^2yt

∇^2zx ∇^2zy ∇^2zz ∇^2zt

∇^2tx ∇^2ty ∇^2tz ∇^2tt

which we call matrix M2

Now applying the universal law of physics,

Energy density matrix x space-time curvature matrix = I

Where I is the unit matrix 4x4 ie M1 x M2 =I

The same expression applies exactly to magnetic field squared μH^2.

Meaning is that electric and magnetic fields are two faces of the same coin.

And/or magnetic MONO Pole exist.

Q4-

Can waves interact with one another?

A4-

We assume that all kinds of waves, EMW, quantum waves, sound waves etc.. interact with each other.

In addition, we assume also the rule or law controlling this interaction as:

f1 + f2 = f3 + f4 . . . . (16)

Where f1 and f2 are frequencies entering in the interaction and f3 and f4 are frequencies emerging out from the interaction.

It should be noted that eq 1 is very important and can derive the so-called Planck's quantum distribution law without the need for Planck's assumption:

E=n h f with n =1,2,3 ..., infinite.

Note that the interaction we describe,

f1+f2=f3+f4,

is called mathematiccally frequency conservation rule. Similar relations do appear in several branches of physics, but they are not yet a universal law.

Q5-

Is it true that diffusion in vacuum exist?

A5-

Yes it is true that diffusion in vacuum exist and can be calculated theoretically and measured experimentally.

The diffusion in free space is the origin of the Big Bang creating our universe millions or billions of years ago and still creating other universes up to this time.

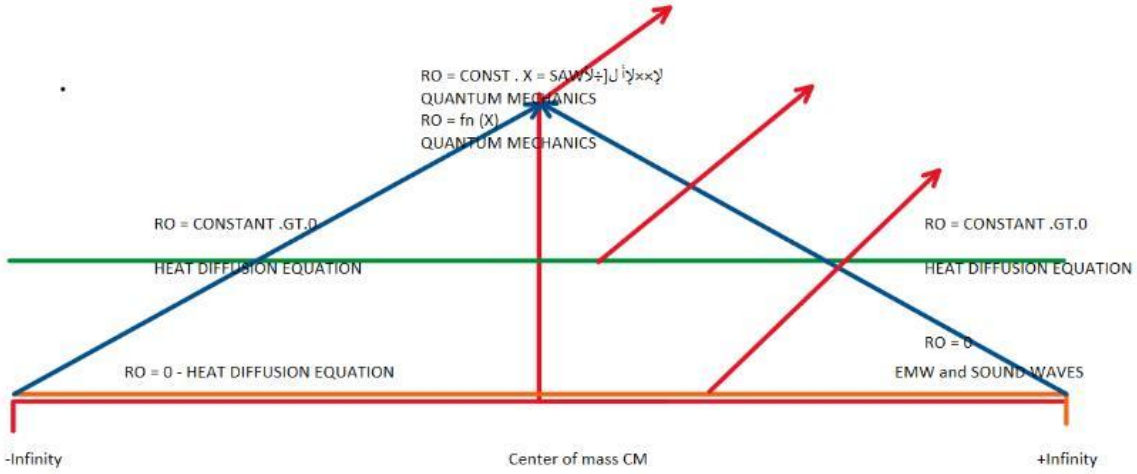

Fig 1. RO of Q-transition matrix has triangular shape.

Fig.5 One dimension energy density diffusion in vacuum and Big Bang

Q6-

Is it time to replace the vector space with the matrix space?

A6-

Yes for many reasons most important of which is that vector division or vector inverse is not defined whereas matrix inverse is well defined as 1/M which results in M*1/M =I Where I is the unit matrix. We think that the classic vector space R^4.space Where the distance between two points d is defined as, d^2=x^2+y*2+z^2-C^2 t^2 . .. . . (1) should be immaculately replaced by the matrix space proposed by the author in 20220/2023 where the distance between tow matrices M1(x1,y1,z1,t1) and M2(x2,y2,z2,t2), d^2=.=x^2+y*2+z^2+ C^2 t^2 +hypoteneuse^2 = constant. .. . . (2) For many reasons ; i-Equation (2) is Pythagorean while eq 1 is not. ii-In Equation 1 there is no definition for vector inverse and or division, i.e., vector A / vector

B (A/B) does not exist while in space ii Matrix the matrix inverse is well defined as,

M1^-1=M 2 and

M1*M2=I

Where I is the unit matrix.

It is worth mention that A. Einstein was swinging between spaces 1 &2 while E. Schrodinger and N. Bohr never knew space 2.

Some brainwashed mathematicians and physicists may argue that eq 1is's not how a matrix space is defined in mathematics and also none of the commonly used matrix distances is calculated like that.

The answer is simple:

a matrix space have never been defined before in physics or in mathematics and also this is the first time in history a double statistical symmetrical matrix space is introduced.

This space is working efficiently and precisely to 6 digits in all fields of physics and mathematics.

Consequently it must be exact.

Q7-

Is it true that the physical information is not yet well defined?

A7-

To our knowledge there is no commonly accepted definition of the amount of physical information, and most people are referring the amount of information to the previous writings which is neither true nor physical.

The amount of physical information is conserved inside any control closed volume bounded by Dirichlet conditions which is a universal law in physics impossible to break. That is why the authors proposes

a rigorous definition for the physical volume density of information field H(x,y,z,t).

Furthermore, this information field H(x,y,z,t) exist everywhere in our universal space and transfer with the velocity of light C. Additionally, this information field H(x,y,z,t) is conserved and is the commanding field. In other word no diffusion of any kind of other fields (EM, Heat, Sund. .etc.) cannot occur without the permission of the proposed information field H(x,y,z,t).

Q 8-

Is it true that Bohr correspondence principle in QM is stolen?

A8-

Yes. We assume that Bohr correspondence principle in QM (1927) is stolen from Einstein Laser theory (rarely mentioned) in 1916.

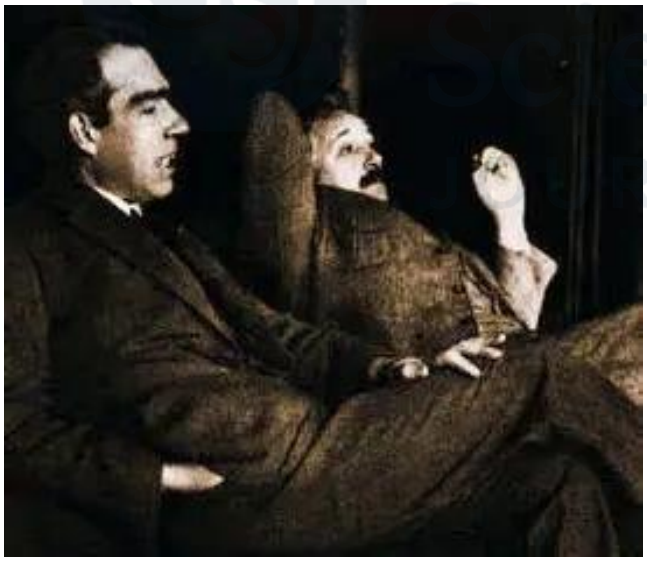

Fig.6 Bohr and Einstein were two close friends dinning frequently together.

The Bohr–Einstein debates were a series of public disputes about quantum mechanics between Albert Einstein and Niels Bohr. Their debates are remembered because of their importance to the philosophy of science, insofar as the disagreements—and the

outcome of Bohr's version of quantum mechanics becoming the prevalent view.

But Bohr’s correspondence principle was not proven to be stolen from Einstein’s 1916 work.

Einstein’s radiation theory introduced ideas about quantum transitions and stimulated emission, whereas Bohr’s correspondence principle was about making quantum theory agree with classical physics in the macroscopic limit. The two ideas are connected, and they have similar concepts.

Q 9-

Det(A) . det(B) = det(A.B) is this a universal law of physics?

A9-

Yes it is always true.

We assume the fact that,

det(A) . det(B) = det(A.B) . . . (1)i

s a universal law of physics that has no mathematical proof.

To our knowledge, ell attempts of mathematicians to prove the above statement or physical law continues without cession during the last century and up to date have failed.

The question arises:

did we get any serious results.

The relation to det(AB)=\det(A)\det(B), has not been, by itself, a well-posed universal question in mathematics. Yes, there are very serious established results, but no universal multiplicativity theorem of the proposed physical kind. It is a mathematically precise boundary-condition problem proving that every physically admissible anomaly is a removable deriving multiplicativity from independent physical principles. Which means that the proposed universal

physical determinant is well-defined and agrees with established determinants in controlled limits and lastly, producing a new experimentally distinguishable consequence. That's obvious and it is what's required. Anything materially weaker may still be a serious theorem, but it would not establish universal determinant multiplicativity as a physical law (1).

Consequently no one can answer the related question: When does det[A+B] = det[A] + det[B]? , , ,(2)

Which is also a serious question but unfortunately mathematicians use its fictitious proof of 1 to prof the second identity 2 :

Det (AB)=Det(A).Det (B) . . . (2)

We believe that both identities 1 & 2 belong to physics as physical laws and neither of them has a mathematical proof...

Q10

10-Is the square of E and H quantized?

A10

The authors propose replacing the incomplete and poorly understood Maxwell four PDE equation describing E and H, introduced in 1861 with its more complete and accurate square E^2 and H^2 [6].

We assume that the proposed square of the Maxwell equation in electomagnetism inherently contains all its information, including the quantization issue.

In other words, to solve the classical Maxwell equations, one must first solve its square using the same geometry and the same Dirichlet condition (such as the heat diffusion equation), and then find the

square root, which is assumed to be the correct solution to the classical Schrödinger equation in question.

Note that for any x-vector solution of the quantum energy density.

3. The geometry of the boundaries of quantum transport matrix A must be triangular, with its vertex at the center of mass (CM).

4. The transport matrix A implies that the diffusion of the quantum energy density within any quantum system must be negative.

5. The transport matrix A must be able to solve all types of quantum mechanics problems without the need for the unnecessary quantization of the angular momentum theory proposed by N. Bohr in 1905: mvr 2πe = nh, where n = 1, 2, 3, ... to infinity. Etc.

Now we finally explain through few unitary 4D xt figures and shapes how we can increase the amount of information [2,3,4].

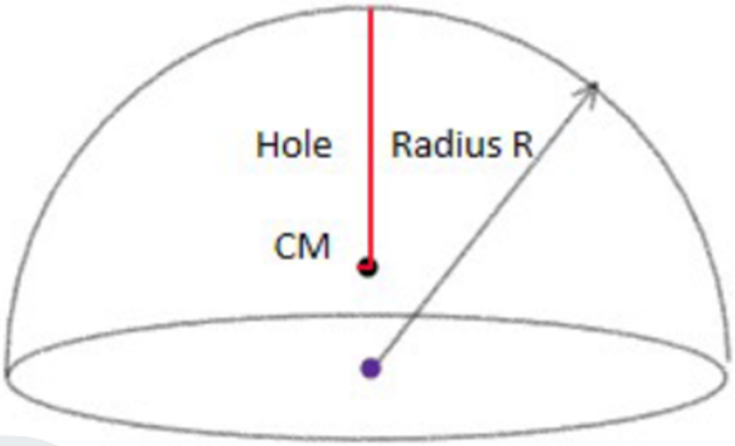

Fig 7-A regular hemisphere.

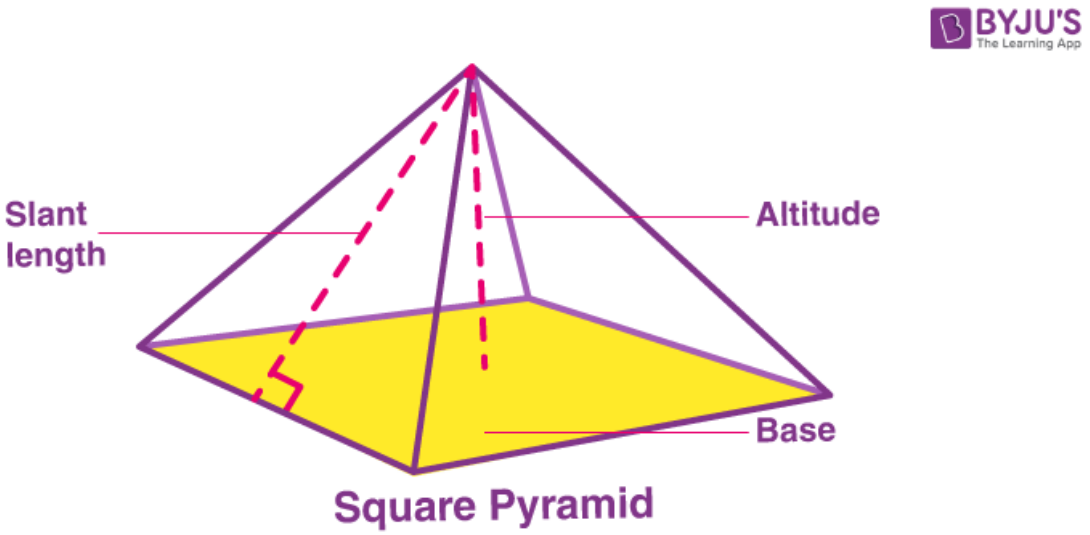

Fig 7 –B regular pyramid with square base.

What is magic here is that these 3D objects can work as Light wave amplifier and or sound wave amplifier [3].

The first requirement is polishing and plating the intenal walls with bright metals of reflectivity 99% or more.

The second requirement is drilling bigger hole say one mm dameter at the middle and another tyny hole say 0.1 mm diameter at the vertex.

The third requirement is to evacuate the inside of these shapes to a high vacuum level.

Prediction is that a ray of light wave(or sound wave) entering at the bigger hole will emerge from the tiny one amplified approximately 100 times [3].

ConclusionIn

The 4 Maxwell classical simultaneous PDE in electromagnetism are now too old, incomplete and in many cases misleading.

Further more, in this article, we present, analyse, and answer in brief 10 important and urgent questions:

1-What are the fundamental forces in EM or QM system?

2-What is time complexity?

3-Do we need the classical four Maxwell simultaneous PDE?

4-How do waves interact with one another?

5-Is it true that diffusion in vacuum exist?

6-Is it time to replace the vector space with the matrix space?

7-Is it true that the physical information is not yet well defined?

8-Is it true that Bohr correspondence principle in QM is stolen?

9-Det(A) . det(B) = det(A.B) is this a universal law of physics?

10-Is the square of E and H quantized?

In addition we present few geometrical figures or shapes that can work as light(or sound) intensity amplifier in the unitary 4D xt space.

The previous numerical results of generating new mathematical and quantum mechanical rules and formulas or theorems are remarkably accurate to six digits which suggests that the classical applied mathematics is merely a branch of physics and that modern geometry belongs to physics not to classical mathematics. This means that the new physics will be sooner or later, the cornerstone able to stop and put an end to a century of AGONY.

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merely a branch of physics and that modern geometry belongs to physics not to classical mathematics.

This means that the new physics will be sooner or later, the cornerstone able to stop and put an end to a century of AGONY.

Finally, it is important to note again 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.

Aknowledgement

The author expresses his gratitude to the MilitaryTechnical College, a distinguished joint venture of Cairo University where he began his career at the college as a lecturer assistant in physics and mathematics, in collaboration with an extremely distinguished group of Czechoslovak and Russian experts.

An experience that was both enjoyable and rewarding until he later became a professor and head of the Department of Basic Sciences, which comprises experimental and theoretical physics aswell as pure mathematics.

During this long experience. He went to the Atomic and Nuclear Physics Center in Toulouse, France, where he earned his doctorate and worked as a professor at ULP and UPS Universitas, as well as a research director at CNRS in France.

The last experience, as with the first, was an opportunity to collaborate with the best leaders and the latest scientific knowledge.

It is worth noting that the authors use their own Fortran language Algorithm similar to those in references 31-34.

No Python or MATLAB is needed.

References

1. Google and Wikipedia search.

2. Ismail Abbas et al., How to Generate New Mathematics - Parts I,II,II,IV, ResearchGate, GSJ Journals,2025.

3-I. Abbas et Al, What do you know about quantum mechanics?,

Parts I,II,III,IV, ResearchGate , GSJ journals, June 2026.

4-I. Abbas et Al, What do you know about electromagnetic theory?,

, ResearchGate, August 2026

5- I. Abbas, A Numerical Statistical Solution to Laplace and Poisson Partial Differential Equations, ResearchGate, International Journal of InnovativeScience and Research Technology, October 2020.

6-I Abbas et al, What do you know about EM theory, ResearcGate, Aug 2026.

7-I.Abbas et al, Is Time Continuous or Discrete? December 2025,International Journal of Innovative Science and ResearchTechnology DOI:10.38124/ijisrt/25dec6998- I. Abbas, Time Components and the Collapse of Einstein's Theories of Relativity, August 2025.

8- Theory and Practice of Quantum Mechanics,ResearchGate, April 2026.

9-I.Abbas, Fall and Rise of matrix mechanics,Volume 9, Issue1,January2024, International Journal of Innovative Science and Research Technology, ISSN No:-2456-2165IJISRT24JAN569www.ijisrt.com 57.

10-I. Abbas et al, The Theory of EverythingGSJ:Volume 13, Issue12,December 2025ISSN 2320-91861486GSJ©2025www.globalscientificjournal.comOctober2025Qu

ality Engineering GSJ: Volume 13, Issue 9,September2025,(GSJ: Volume 13, Issue 9,September 2025).

11- T. Koga, Introduction to Kinetic Theory Stochastic processes in gaseous systems, by Toyoki Koga, Book, Pergmann Press.

12- I. Abbas,Theory and Practice of sound waves in audio rooms.

13- I.Abbas,Theory and Practice of sound waves in audio rooms, statistical view.

14- Theory and Practice of Quantum Mechanics,ResearchGate, April 2026.

15- I. Abbas, PDF, Using matrix algebra, how to show that the infinite power series [(1+2x)/3]^N is equal to (1+2 x)/(2-2 x),∀x∈[0,1].

16-Fundamentals of Artificial Intelligence, Book, Amazon.

17-I. Abbas, A rigorous reform of mathematics and physics, ResearchGate, International Journal ofInnovative Science and Research, Jan2025,March2025International Journal of Innovative Science ResearchTechnology DOI:10.38124/ijisrt/25mar506Lab:IsmailAbbas's Lab

18-I. Abbas, Quantum Puzzle, Vacuum Dynamics and the Big Bang, Volume 9, Issue 6, June 2024,International Journal of Innovative Science and ResearchTechnology, ISSN: 2456-2165,https://doi.org/10.38124/ijisrt/IJISRT24ijisrt.com,2185

19- I. Abbas, How to transform B matrix chains into Markov chains and vice versa, ResearchGate, IJISRT journal, 2023.

20- J. Matthews, Numerical Methods for Mathematics, Science and Engineering, Book 1995.

21- L. Landau, Theoretical Physics, translated from Russian, BOOK. Bergman Publishing House, Australia,

22-I. Abbas, Theory and design of audio rooms-Reformulation ofthe Sabine formula, ResearchGate, IJISRT review, October 2021.

23-I.Abbas et al, Theory and design of audio rooms –Physical formulation, ResearchGate, IJISRT.

24- I.Abbas, An Effective Alternative to Current MathematicsOctober 2024International Journal of Innovative Science and Research TechnologyDOI:10.38124/ijisrt/IJISRT24SEP1243Lab: IsmailAbbas's Lab

25-DOI:10.38124/ijisrt/ijisrt24apr1768Corpus ID: 269592089

An Efficient Replacement for Schrödinger's Partial Differential Equation

Ismail Abbas

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26-Professor Stefka Gueorguieva, Professor of Mathematics and Computer Science, University of Bordeaux, France, personal communication.

27-Strasbourg Juvenile Collection: Computer Assisted Anthropology for the Anterior Fontanelle Reconstruction and Size Evaluation Article, April2009,Pascal Desbarats,Stefka Gueorguieva, RémiSynave

28-I.Abbas, A Rigorous Reformulation of Einstein derivation of the special relativity, IJISRT, DOI:https://doi.org/10.5281/zenodo.6324421,Feb 1922.30-

29-I. Abbas et al, The Theory of Everything October2025, Quality Engineering GSJ: Volume 13, Issue 9,September 2025,(GSJ: Volume13, Issue9,September 2025)

30-I.Abbas et al, What do you know about quantum mechanics-Part I, ResearchGate, May 2026.

31- I. Abbas et al, New Physics and quantum mechanics, ResearchGate, May 2026. Quantum Mechanics. ResearchGate, April 26.

32- I.Abbas, BOOK, Foundations of Artificial Intelligence, Theory and Practice.GSJ: Volume 13,Issue 12, December 2025ISSN 2320-91861488GSJ©2025www.globalscientificjournal.com

33- I.M. Abbas et al., A Critical Analysis of Ionizing Wave Propagation Mechanisms in breakdown, I. Abbas, B. Bayle, Physics D: Applied Physics 13(6),8.

34. I.M. Abbas et al., IEEE, 1996, Pseudo Spark Discharge, Plasma Science (PDF) What Do You Know About Quantum Mechanics? Part II. Available from: https://www.researchgate.net/publication/407441835_What_Do_You_Know_About_Quantum_Mechanics_Part_II [accessed Jun 29 2026].