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New Physics and Quantum Mechanics

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Abstract

Mathematics entered physics as a tool but little by little it transformed to be the master.

In the sense that most people believe that mathematics can generate new physics when the opposite is true.

The author proposes a reformulation of classical and quantum mechanics and physics using Cairo techniques, bounded statistical systems, and novel mathematical frameworks to uncover hidden laws in classical and quantum physics.

In previous six articles entitled How to Generate New Mathematics - Parts I, II , III, IV, Can we think outside the box and How to Merge Quantum mechanics in General Relativity, we discussed how to apply the statistical theory of Cairo techniques to generate new laws and rules in most fields of classical and quantum physics, statistics, and pure mathematics.

The present article uses the same techniques to examine Schrodinger equation in particular and the subject of quantum mechanics as a whole which is in fact are currently not well defined or even mal-defined.

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.

In this paper, We uncover the surprising fact that classical Schrödinger's equation in 1927 is missing the source/sink term which makes it incomplete and misleading.

Six important and urgent questions arise:

1-What is the grave mistake in Schrödinger's partial differential equation in 1927?

2-Is it true that both Schrodinger equation and Einstein GR belong to one and the same theory?

3-Is it possible to introduce a new single global theory of space-time that combines SE and GR among other theories which will make a breakthrough in physics and mathematics?

4-Is it true that Schrödinger's partial differential equation in 1927 is nothing but the square root of the heat diffusion partial differential equation?

5- Is it true that the Einstein curvature tensor does not represent the curvature of space-time?

6- Is it true that Fourier's theory is unnecessary?

This is a part of new physics that we call Abbas new Physics for distinction.

**** Note that the basic concept behind Abbas's new physics in describing the nature of our universe is in a new unified four-dimensional x-t space where time t is a revolutionary fourth intertwined axis perpendicular to the three geometric axes x, y, and***

2- but it is not a separate element that controls from outside the system as was the case during the past century.

***** Also note that this is the first time that the time t is correctly defined and incorporated into the unified four-dimensional space xt.***

For example, Einstein once stated that time is an illusion and does not exist?

Thanks to the well-defined statistical theory for the B matrix series, which is the result of Cairo techniques, the answer to all of the above questions is generated as yes, and moreover, new rules and theories have been generated.

The answers to the six questions above are the subject of this article.

Finally, it should be clarified that this article is not intended to minimize the major contributions of great physicists and mathematicians such as Einstein, Schrödinger, Heisenberg, Minkowski, Hilbert, and Riemann, among others, but rather to address the main slips 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. Comprehensive introduction containing theory and numerical results

Mathematics entered physics as a tool but little by little it transformed to be the master.

The author introduces the concept of new physics in a bounded statistical system, defined as a closed control volume with Dirichlet boundary conditions.

We call this new framework Abbas new physics for distinction.

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.

This framework belongs to the statistical theory of Cairo Techniques which is a 4D unitary numerical statistical method that Abbas uses to reformulate both classical and quantum mechanics.

It involves transition chains such as B and Q-Transition Matrices to correct incomplete or misleading aspects of the time dependent PDE such as Schrödinger equation among others, allowing for a more precise description of classical and quantum energy distributions.

In previous articles entitled How to Generate New Mathematics - Parts I, II , III, IV,V and VI in addition to Can we think outside the box and How to Merge Quantum mechanics in General Relativity we have discussed how to apply the statistical theory of Cairo techniques to generate new solutions, new laws and rules in most fields of classical and quantum physics, statistics, and pure mathematics [2,3,4,5,6,7].

Quite surprising is that the classical Schrodinger equation in 1927 in particular and the subject of quantum mechanics as a whole are not well defined or it is even mal-defined.

What is more surprising is that Schrödinger's current equation in particular, and the subject of quantum mechanics as a whole, are not well understood just because it is wrong defined.

The B-transition matrix was presented by the author in 2020 [8]to numerically solve the Laplace and Poisson PDE in the most general case without the need for the classical FDM techniques or even the need for PPDE and LPDE themselves.

Since that time, this revolutionary new physics has been working efficiently in solving almost all unanswered problems of physics and mathematics.

In this article, we advance and provide answers to the following important and urgent questions:

1-What is the grave mistake in Schrödinger's partial differential equation in 1927?

2-Is it true that both Schrodinger equation and Einstein GR belong to one and the same theory?

3-Is it possible to introduce a new single global theory of spacetime that makes a breakthrough in physics and mathematics?

4-Is it true that Schrödinger's partial differential equation in 1927 is nothing but the square root of the heat diffusion partial differential equation?

5- Is it true that the Einstein curvature tensor is useless and does not represent the curvature of spacetime?

6- Is it true that Fourier's theory is unnecessary?

The basic concept behind the six revolutionary reforms or corrections mentioned above is the nature of our universe, which lives and works in a new unified four-dimensional space x-t, where time t is considered a fourth axis interwoven and natural relative to the three geometric axes x, y, and z, rather than a separate element that governs as was the case in the last century.

Consequently, we assume that each physical or mathematical problem has a natural statistical solution that works in an appropriate 4D unit xt space-time, bounded by a closed control volume, which is in itself the theory of Cairo techniques.

Thanks to the well-defined statistical theory for the B matrix series, which is the result of Cairo techniques, the answer to all of the above

six questions is generated as yes, and moreover, new rules and theories have been generated.

Note that, on the other hand, current theories adopt mutually incompatible ontological structures:

some treat space-time as being dynamic while others treat it as fixed; some require strictly local interactions while others admit nonlocal correlations; and some depend fundamentally on quantization whereas others rely on smoothness and continuity.

It follows that fundamental concepts such as space, time, causality, entanglement and locality cannot be coherently defined within one theory without being negated by another.

Q1-

What is the grave mistake in Schrödinger's partial differential equation in 1927?

A1

The classic Schrödinger's partial differential equation in 1927 is: expressed as:

d/dt)partial [Ψ] =-h^2/2 m Nabla^2 Ψ + V Ψ . . (1)

And its square is expressed as:

d/dt)partial [Ψ]^2 =-h^2/2 m Nabla^2 Ψ + V Ψ^2 . . (2)

The grave mistake made by Schrödinger and all its followers is that they missed adding the intrinsic source S1 and extrinsic source S2 which modifies equations 1,2 into:

d/dt)partial [Ψ] =-h^2/2 m Nabla^2 Ψ + V Ψ +S1+S2 . . (3)

And,

d/dt)partial [Ψ] =-h^2/2 m Nabla^2 Ψ + V Ψ +S1+S2. . (4)

In equation 4 the intrinsic S1 and S2 units are J.m^-3 sec and is proportional to [Ψ]^2 and moreover the extrinsic S2 should be well defined in advance.

The grave mistake made by Schrödinger and all its followers is that they missed adding the intrinsic source S1 and extrinsic source S2 which modifies equations 1,2 into:

d/dt)partial [Ψ] =-h^2/2 m Nabla^2 Ψ + V Ψ +S1+S2 . . (3)

And,

d/dt)partial [Ψ] =-h^2/2 m Nabla^2 Ψ + V Ψ +S1+S2. . (4)

As a simple example , the paradox of Schrodinger cat in a box with a bomb inside is not a paradox just if we sufficiently predefine the external bomb source time of explosion t.

for example if t tends to infinity the cat will never die and will live forever.

Q2-

Is it true that both Schrodinger equation and Einstein GR belong to one and the same theory?

A2-

It is true that both Schrodinger equation and Einstein GR belong to one and the same theory?

We assume that we can combine both theories in 4 consecutive steps:

Step 1

Write SE in the correct form of SE by adding the two missing terms S1 and S2:

The classic Schrödinger's partial differential equation in 1927 is: expressed as: d/dt)partial [Ψ] =-h^2/2 m Nabla^2 Ψ + V Ψ . . (5)

And its square is expressed as:

d/dt)partial [Ψ]^2 =-h^2/2 m Nabla^2 Ψ + V Ψ^2 . . (6)

The grave mistake made by Schrödinger and all its followers is that they missed adding the intrinsic source S1 and extrinsic source S2 which modifies equations 1,2 into:

d/dt)partial [Ψ] =-h^2/2 m Nabla^2 Ψ + V Ψ +S1+S2 . . (7)

And,

d/dt)partial [Ψ] =-h^2/2 m Nabla^2 Ψ + V Ψ +S1+S2. . (8)

In equation 8 the intrinsic S1 and S2 units are J.m^-3 sec and is proportional to [Ψ]^2 and the extrinsic S2 should be well predefined.

Step 2

Consequently, the correct expression for spacetime curvature in SE in the unified four-dimensional x-t space and the formulation of the Laplacian matrix will be,

∇^2xx ∇^2xy ∇^2xz ∇^2xt]U (x,y,z,t)

∇^2yx ∇^2yy ∇^2yz ∇^2yt]U(x,y,z,t)

∇^2zx ∇^2zy ∇^2zz ∇^ zt]U(x,y,z,t)

∇^2tx ∇^2ty ∇^ 2tz ∇^2tt]U(x,y,z,t)

We call this Matrix M5.

Where U(x,y,z,t) is the quantum energy density of the concerned system in J m^-3 sec

Step 3

In a similar way the correct expression for the Einstein free space energy density U(x,y,z,t) in the unified four-dimensional x-t space and via the formulation of the Laplacian matrix will be,

∇^2xx ∇^2xy ∇^2xz ∇^2xt]U(x,y,z,t)

∇^2yx ∇^2yy ∇^2yz ∇^2yt]U(x,y,z,t)

∇^2zx ∇^2zy ∇^2zz ∇^ zt]U(x,y,z,t)

∇^2tx ∇^2ty ∇^ 2tz ∇^2tt]U(x,y,z,t)

We call this Matrix M6.

Step 4

When the statistical matrix equation of motion in matrix mechanics

Of the SE is written in the unified four-dimensional x-t space and the formulation of the Laplacian matrix called M5 and similarly when the statistical equation of motion of Einstein GR via Laplacian matrix mechanics M6 and then we apply the golden rule , sometimes called Abbas equation for distinction:

Energy tensor U(x,y,z,t) x spacetime Curvature tensor C(x,y,z,t)= I . . (9)

Once for M5 and second for M6 we conclude that both

Schrodinber equation in QM and GR belong to the B-matrix chains of the Cairo techniques and to equation 9 in the same way.

They belong to one and the same theory

Q3-

Is it possible to introduce a new single global theory of space-time that combines SE and GR among other theories which will make a breakthrough in physics and mathematics?

A3-

Yes

This question turns to be :

Does Maxwell's electromagnetic theory need to be reformulated to be compatible with Einstein's general relativity?

This question was Albert Einstein's last thought, but his limited skills in physics and mathematics prevented him from bringing it to fruition.

Einstein's idea is generally considered that of an absolute genius, but how could it have been implemented?

In 2020 the author solved Laplace PDE LPDE and Poisson PDE PPDE using the B-matrix chains techniques without resoting to classical finite difference methods and via completely neglecting both LPDE as if they never existed.

The statistical assumptions that replace Maxwell eqution are [13,14,15,16,17]:

The statistical transition matrix B = (Bi,j) itself is well

defined by statistical assumptions.

For 2D Cartesian coordinates, the entries B i, j comply with

or are subject to the following conditions:

i- B i, j = 1/4 for i adjacent to j .. and B i, j = 0 otherwise.

probability aperiori equal.

ii- B i, i = RO, i.e. the main diagonal is made up of constant

inputs RO

For 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 the free nodes

iii- B i, j = B j, i, for all i, j.

The matrix B is symmetrical to conform to the physical principle of detailed balance.

iv- The sumof 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 differentfrom the Laplacian mathematical matrix A and from the Markov transition matrix.

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

How ever the correctness and precision of the results obtained via B-matrix chains techniques for all the theories of QM,GR and LPDE and PPDE show that in references 13,14,15 show that all of the three above theories belong to B-matrix chains in the same way.

They belong to one and the same theory

Q4-

Is it true that Schrödinger's partial differential equation in 1927 is nothing but the square-root of heat diffusion PDE?

A4-

Yes,It is true that Schrödinger's partial differential equation for Psi in 1927 is nothing but the square root of heat diffusion PDE.

In the sense that Schrödinger's partial differential equation in 1927 is unnecessary since you can solve the heat conduction PDE for the similar geometry and similar boundary conditions which will be the solution for Psi^2 and then find its square root which will be the solution for PSI itself.

Q5-

Is it true that the Einstein curvature tensor does not represent the curvature of space-time?

A5-

Einstein theory of GR introduced and functions in Riemann space which is expressed as:

X^2+y^2+z^2-C^2t^2=0

Which yields anti-Phythagrian spacetime tenso and cannot introduce currect space time curvature.

On the otherhand, the B-matrix statistical chains exprsses the phythagoras tensor for curvature of spacetime as,

The first breakthrough here is to extend the Cauchy Riemann stresstensor to the 4Dunitary xyzt space where this extension is logicallyassumed as,

Fxx Fxy Fxz Fxt

Fyx Fyy Fyz Fyt

Fzx Fzy Fzz Fzt

Ftx Fty Ftz Ftt

The second breakthrough is to express the above Stress tensor interms of Laplacian ∇^2 as follows,

∇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 the above stress tensor or matrix M1.Note that transition matrix summation B+B^2+B^3+...for finitenumber of iterations or time jumbs N is a tensor whereas for N tendsto infinity it turns into matrix

The third breakthrough is to assume that the multiplication of thetensors involved in Equation 1 below is indeed the same as thegeneralization of the universal law called Cauchy-Riemann tensor in4D unit space xyzt.

M1 * M2 =I . . . . . (1)

Where M2 is the strain or curvature tensor.

The forth breakthrough here is that we should properly define andexpress the curvature tensor M2 in terms of ∇^2 as follows,

M2=∇2xx ∇2xy ∇2xz ∇2xt∇2yx ∇2yy ∇2yz ∇2yt∇2zx ∇2zy ∇2zz ∇2zt∇2tx ∇2ty ∇2tz ∇2tt . . . etc.

Now, the multiplication M1 * M2 in equation 1 gives the correct expression for general relativity equation in matrix form.

Q6-

Is it true that Fourier's theory is unnecessary?

A6-

The breakthrough here is to find the quantum transition matrix Q in triangular form and then find the transfer matrix D(N)=1/[I-Q],which will be expressed as,

he statistical theory of Cairo techniques proposes the followingpowerful quantum transfer matrix D [16,17,18,19,20]:D 19x19=

247/400 9/16 -9/50 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 01/2 1/25 3/5 -7/50 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0-7/50 21/40 53/200 91/200 -21/200 0 0 0 0 0 0 0 0 0 0 0 0 0 0 00 -21/200 39/100 23/50 33/100 -3/40 0 0 0 0 0 0 0 0 0 0 0 0 0 00 0 -3/40 11/40 5/8 9/40 -1/20 0 0 0 0 0 0 0 0 0 0 0 00 0 0 -1/20 9/50 19/25 7/50 -3/100 0 0 0 0 0 0 0 0 0 0 00 0 0 0 -3/100 21/200 173/200 3/40 -3/200 0 0 0 0 0 0 0 0 0 00 0 0 0 0 -3/200 1/20 47/50 3/100 -1/200 0 0 0 0 0 0 0 0 00 0 0 0 0 0 -1/200 3/200 197/200 1/200 0 0 0 0 0 0 0 0 00 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 00 0 0 0 0 0 0 0 0 1/200 197/200 3/200 -1/200 0 0 0 0 0 00 0 0 0 0 0 0 0 -1/200 3/100 47/50 1/20 -3/200 0 0 0 0 00 0 0 0 0 0 0 0 0 -3/200 3/40 173/200 21/200 -3/100 0 0 0 00 0 0 0 0 0 0 0 0 0 -3/100 7/50 19/25 9/50 -1/20 0 0 00 0 0 0 0 0 0 0 0 0 0 0 -1/20 9/40 5/8 11/40 -3/40 0 00 0 0 0 0 0 0 0 0 0 0 0 -3/40 33/100 23/50 39/100 -21/200 00 0 0 0 0 0 0 0 0 0 0 0 0 0 -21/200 91/200 53/200 21/40 -7/500 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -7/50 3/5 1/25 1/20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -9/50 9/16 247/400

Note that,

D^2=D and hence Q^2=Q which is property of quantum eigenmatrix.

This type of matrices A=A^2 is called in physics idle matrix and in mathematical terms,an idempotent matrix has eigenvalues ev of 0 or 1 which satisfy the golden rule ev = ev^2 [2,4,5,18,19,23]. This stationary distribution is sometimes called quantum particle in

acentral field.the vector b above is the eigen vectors of the transfer matrix D witheigen value ev=1 only ifQ.b*= b.The numerical result of matrix multiplication above is b*=,[-877/6250 -163/1000 -

Note also that the input elements of transfer matrix for Fig2 correspond to the numerical values of Fourier transform on th 9 boundary conditions.

That is why one may say that Fourier transform is unnecessary because it is incuded in B-transition matrix chains.

III. NOTE ON THEORY and NUMERICAL RESULTS

Nature is statistically symmetric and bounded [1]

Nature's creatures exhibit a wide range of symmetry, from the intricate patterns of snowflakes to the streamlined bodies of sharks.

What you need to master operation of B-matrix chains or any other statistical theory is:

1-Perfect knowledge of universal laws of physics theory and practice from distinguished text books [22,23] .

2-Mangement of programming langugas and their corresponding best algorithms [26,27,28].

3-Personally we recommend programming langugas as Fortran or C++.

Every physical or mathematical problem has a natural statiscal solution that works in appropriate bounded control volume which is in itself the theory of Cairo techniques.

The above fact was the core of generating previous published articles entitled How to generate new mathematics parts 1,2,3,4,5,6 as well as New physics and quantum mechanics which is the present one is the closed control volume shown in Fig.1,2.

. Fig.1, A 2D rectangle of 9 equidistant free nodes with 9 Dirichlet

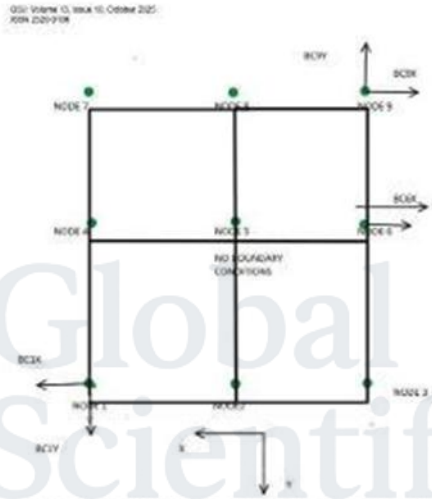

Fig 4. A 2D square discretized in 9 equally spaced free nodes subject to Dirichlet BC in general case.

B9x9=

bundary conditions.

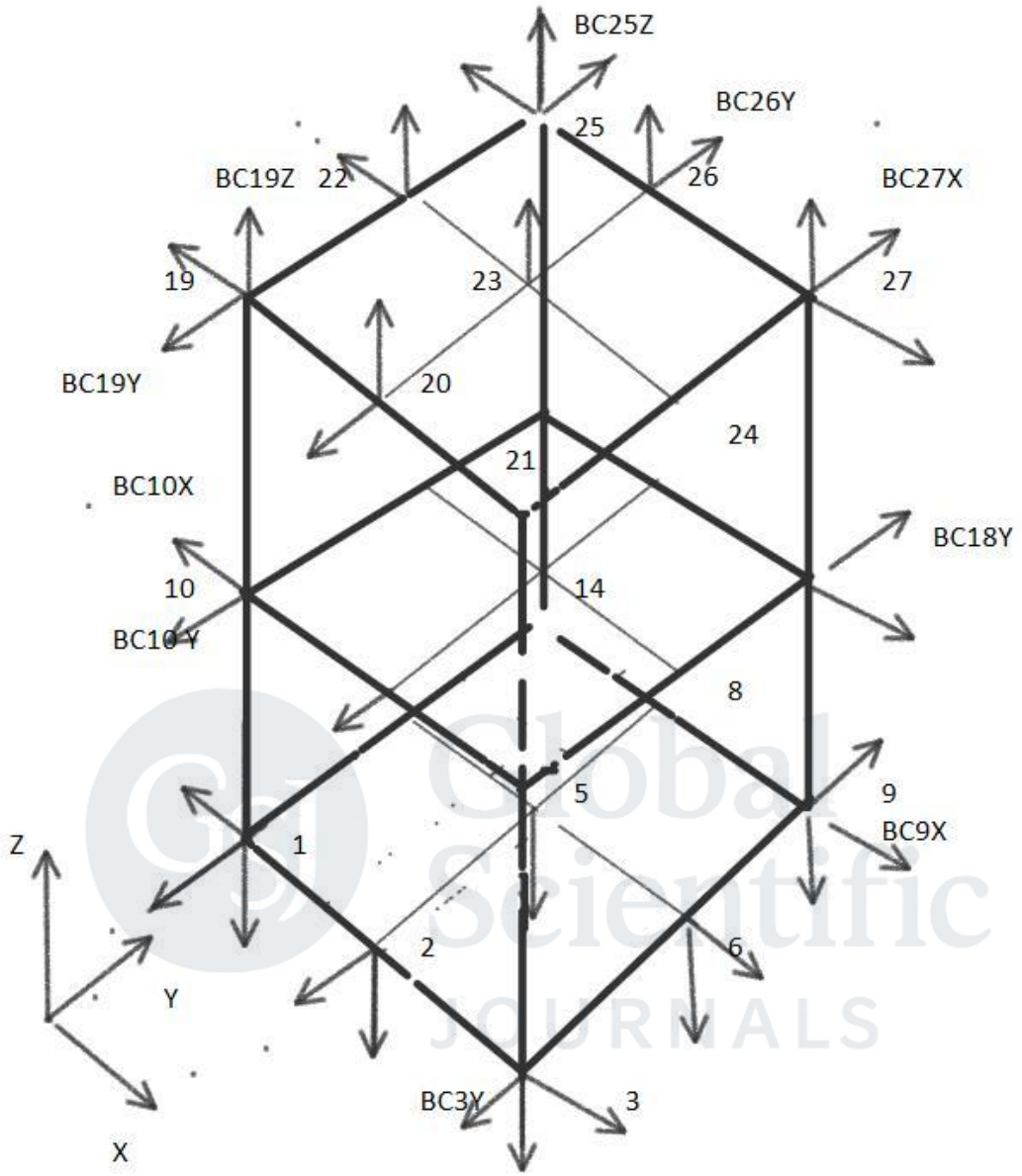

Fig.2, A 3D cube of 27 equidistant free nodes and 27 Dirichlet boundary conditions.

The transition matrix input elements Bi,j =1/6 for i adjacent to j and zero otherwise. This means that for the mid point or free node 14 the transitions from nodes 5,11,13,15,17,23 to node 14 and vice versa are allowed but other transitions are forbidden.

IV-CONCLUSION

Nature is statistically symmetric and bounded [1]

Nature's creatures exhibit a wide range of symmetry, from the intricate patterns of snowflakes to the streamlined bodies of sharks [1,4,5]. Every physical or mathematical problem has a natural statistical solution that works within an appropriate specified control volume, which in itself is the theory of Cairo techniques in statistical mechanics.

We reiterate that Abbas's statistical mechanics based on the statistical transition matrix B is entirely new physics, different from Heisenberg's transition matrix, which is neither statistical nor a transition matrix.

The above fact was the core of relieving previous articles entitled How to generate new entitled How to Generate New Mathematics - Parts I, II , III, IV,V and VI in addition to Can we think outside the box and How to Merge Quantum mechanics in General Relativity in addition to New Physics and Quantum Mechanics.

In this article we introduced and analysed 6 important and urgent questions:

1-What is the grave mistake in Schrödinger's partial differential equation in 1927?

2-Is it true that both Schrodinger equation and Einstein GR belong to one and the same theory?

3-Is it true that Schrödinger's partial differential equation in 1927 is nothing but the square-root of heat diffusion PDE?

4- Is it true that Fourier's theory is unnecessary?

5- Is it true that the Einstein curvature tensor is useless and does not represent the curvature of spacetime?

6- Is it true that Fourier's theory is unnecessary?

Thanks to the statistical theory of B-matrix chains a product of Cairo techniques the answer to all the above questions is generated

as yes and furthermore new rules and theorems have been generated.

Note that in this article we completely ignore Schrodingers theory of 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.

The necessary prerequisites are a sufficient knowledge of 4D unitary spaces xt, matrix algebra, and probability and statistics [1,2,4,5,18,19]

Thanks to the statistical theory of Cairo techniques the answer to all the above questions is yes and furthermore new rules and theorems have been generated.

The numerical results are surprisingly accurate.

Finally, it should be clarified again that this article is not intended to minimize the major contributions of great physicists and mathematicians of their time such as Einstein, Schrödinger, Heisenberg, Minkowski, Hilbert, and Riemann, among others, but rather to address the main slips and limitations of their theories, where applicable.

NB. The author uses his own double precision algorithm, such as that of references 30,31,32,33,34.

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

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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 as well 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 Universits, 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.

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