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Space Physics of the Universe and the Evolution of π Space Quantum

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Abstract: ***The mathematical constant π, defined as the ratio of a circle's circumference to its diameter, has remained an important base of mathematics and science, yet its origins and connections to fundamental universal properties remain elusive. Traditionally viewed through a mathematical lens, this study proposes a novel perspective, linking π to the space-time of the universe. Building on Lord Kelvin's mathematical formulation involving the square root of π, we explore its physical significance as a measure of the interplay between surface and bulk properties of matter in the cosmos. We demonstrate that π governs critical relationships in spatial pressure dynamics, linking "direct space," "inverse space," and "hybridised space" in equilibrium. Furthermore, π is shown to underlie the transition between bulk and surface phenomena, influencing fundamental processes such as harmonic motion. These findings suggest that π is not merely a mathematical abstraction but a universal parameter deeply embedded in the structure and dynamics of space-time. This perspective opens new avenues for understanding π in relation to the physical universe, offering insights into its non-converging nature and its role as a driving force in cosmic processes.***

Keywords: Mathematical Constant π, Space-Time Fabric, Surface and Bulk Phenomena, Spatial Pressure Dynamics, Universal Parameters.

Abbreviations:
EFE: Einstein Field Equations
PFF: Push Forward Forces
TSQ: Theory of Space Quantization
PBF: Pull Back Forces

I. INTRODUCTION

The space of the universe is composed of space points or the point spaces [10]. The physical variables of the space (in the form of quantum) [12], example - entropy, force, energy, EM - wave, time, mass, etc., and others are formed from the translation, rotation, and vibration of the said space points.

There does exist an equilibrium between 'Direct linear space' and 'Reciprocal or inverse linear space'. In the following Figure 1, the said three spaces have been shown diagrammatically. The concept of the 'direct space - inverse or reciprocal space' is:

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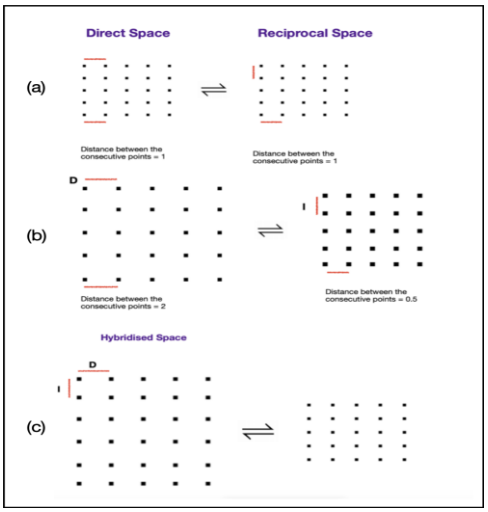
I. The product of the distance between two consecutive points in the direct space (D) and the corresponding distance between two points in the inverse space (I) is always unity
II. Whenever there is any event taking place in either of the two said spaces, the inverse event will take place in the other space. For example following figure 1 (b), the distance between the two consecutive points of direct space is doubled, the distance of the two consecutive points in the inverse space will be halved such that the product of the two new distances retained to be unity.
III. The hybridised space of the universe is formed from the 'direct space' and the 'reciprocal space' in the manner shown in Figure 1(c) below.

So each side (H) of a 'unit cell' of the hybridised space is a geometric mean of D and I: $H = (D \times I)^{1/2.}$



[Fig.1: (a, b & c) Geometry of Direct Space, Inverse Space & Hybridised Space] [10]

This is to understand the fact that the space of the universe must exist in the form of 'hybridised' space, as explained above. Otherwise, the space would have either expanded infinitely or contracted to such an extent that everything would have completely collapsed.

We learn a great deal from the literature about various aspects of the universe, including phenomena such as 'space ripples,' 'gravitational waves,' and 'distorted spacetime,' among others [14]. Notably, the parameter π is intricately related to these phenomena, as seen in the Einstein Field Equations (EFE) of the general theory of relativity. However, there is limited scope in the current literature for students and the scientific community to gain a clear understanding of the physical significance of the parameter π [15]. Until the parameter π is thoroughly understood, the cloud of ambiguity surrounding the

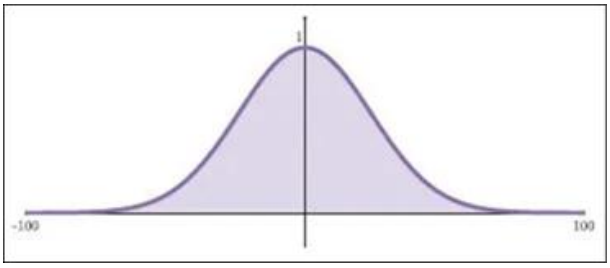
theories of relativity, cosmology, and space physics will continue to loom overhead.

If the space points in the 'direct space' and the 'reciprocal space,' or the 'direct space' and the 'reciprocal space' themselves, continued to remain in equilibrium with each other forever, no energy [4], no mass, no matter would have formed at all, and no evolution would have taken place—neither of plants, trees, rivers, oceans, mountains, the animal kingdom, nor the human race of the universe..

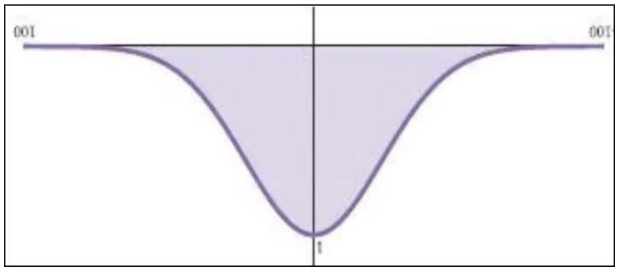
For matter to form, the space points must come closer to each other and interact. In the linear 'direct space' and the associated 'reciprocal space,' the mathematical probability of the space points coming closer to each other is very low because the said points are static. For matter (mass and energy) to form, the space points must move from the bulk interior of the space to the surface, interact with each other, and then flow back to the bulk of the space. A dynamic equilibrium must exist in the space as follows.

Rate at which the space points move from the bulk to the surface = Rate at which the space points move from the surface to the bulk of the space

So, to enable the above equilibrium to occur, space possesses its own impulses, which are short-lived 'push forward forces (PFF)' and 'pull back forces (PBF)'. As shown in Figures 2 and 3, these forces are represented as exponential functions. They exhibit peak maxima or minima, are of a non-converging type, and extend infinitely in both directions.



[Fig.2: The Short-Lived Force Impulse of the Direct Space of the Universe in the form of Square Root of Pi] [12]



[Fig.3: The Short-Lived Inverse Force Impulse of the Reciprocal or Indirect Space of the Universe in the form of Inverse of Square Root of Pi] [12]

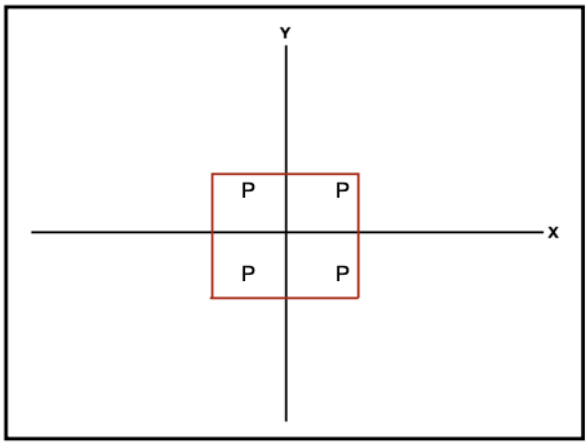
The area under the curves of the Figure 2 and 3 is being represented by Lord Kelvin equations as given below [12]:

$$\int_{-\infty}^{\infty} e - x2\, dx = \sqrt{\pi}. \quad \ldots \quad (1)$$

The area under the curve of Figure 3 is obtained by inverting the LHS and RHS of the above equation (1), which gives us the expression $(1/\pi)^{1/2}$. The value of the above integral, or the area under the curve, is 1.772... (which is the sum of all the smallest possible unit squares under the curve in Figure 2, and the said unit squares are made up of the points in direct space) [13]. Though the above equation of Lord Kelvin is very important and significant for the proper understanding of the quantum nature of the universe, it must be noted that this equation has been highly neglected since its inception in the 19th century. Neither mathematicians nor physicists have fully realized the profound underlying philosophy of the said equation, and as a result, it has not earned the recognition it deserves. In this article, it will be straightforwardly proven that the principles of classical physics, quantum physics, quantum mechanics, the theories of relativity, the recently discovered Theory of Space Quantization (TSQ) [2], and modern quantum computing are all based on π, and this π is grounded in this single equation of Lord Kelvin. The π parameter is an integral part of all the aforementioned theories, as well as an essential element of our very breath of life. The origin of this π can only be traced back to the space and the equation of Kelvin.

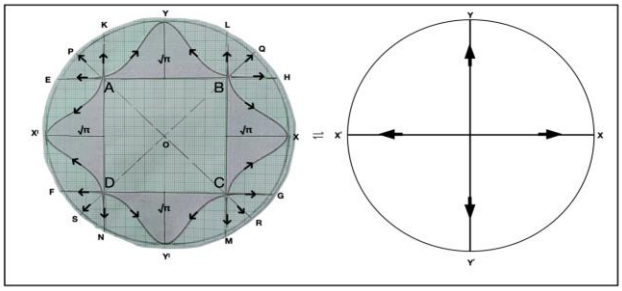
As has been mentioned earlier in this article [9], any event occurring in the direct space enforces an inverse event in the reciprocal space [10]. So this 'PFF short lived impulse $(\pi)^{1/2}$' of the direct space is reciprocated as a 'PBF short lived impulse $(1/\pi)^{1/2}$' of the reciprocal space [3]. Now, in direct space, the superposition (overlapping or hybridisation) of the four numbers of 'PFFs' occurs, and a π quantum is evolved from it. Similarly, the overlapping of the four numbers of 'PBFs' in reciprocal space produces an 'anti-π or inverse π space quantum.

- Note that to obtain the square of any variable, say P, representing a straight line segment, the usual practice is to place the variable P in both longitudinal and lateral positions first, and then place them at equal distances in the diametrically opposite direction. The enclosed area is computed as shown in Figure 4 below, and the same principle has been followed to find the topology of π and (1/π), respectively.

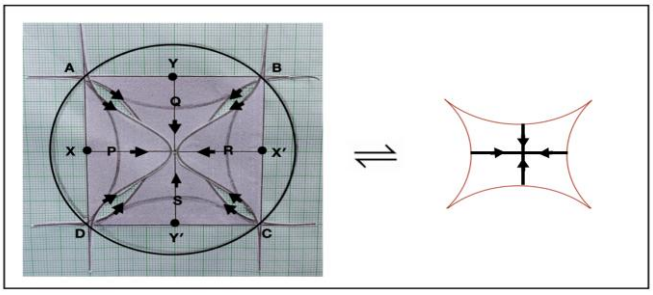


[Fig.4: Process of Finding out the Square of a Variable P] [3].

Figures 5 and 6 below show the mechanism of formation of the π quantum and anti π quantum respectively.



[Fig.5: Evolution of π Quantum From √π From the Space Time in the from of the Smallest Circle of the Universe] [1]



[Fig.6: Evolution of Anti π Quantum (2-D Saddle)] [5]

In Figure 5, the Following Points are to be Noted:

1. At the junction points A, B, C & D of the four numbers of √π areas, the two perpendicular forces are acting in each of the points (for point A, AK & AE, for point B, BL & BH, for point C, CG and CM, for point D, DF, DN and the resultants of the said forces are AP, DS, RC & DS respectively. So due to this resultant forces acting on points A, B, C & D, the points A, B, C & D are driven outwards and the new positioning of the said 4 points become P, Q, R & S respectively.
2. The sixteen numbers of points starting from X, H, Q, L, Y, K, P, E, X′, F, S, N, Y′, M, R, G, in fact form the circumference of a circle and whose area would be π.
3. This said π, or the circle formed, is the smallest possible circle in the universe, with an area of π and a radius of unity (OP = OQ = OR = OS = 1.0). It should be noted that this unit length represents the smallest possible length in the universe.
4. Now, in Figure 5, O is the midpoint of YY′. As the length of YY′ increases, the distances between points P & Q and R & S will also increase, causing the circumference of the circle to increase. Therefore, the circumference of the circle is directly proportional to the diameter YY′, and the constant of proportionality is indeed π. The ratio of the circumference to the diameter of a circle is constant, but the reason behind this constancy, or the mechanism responsible for it, has yet to be discovered. In this article, the long-standing mystery is revealed.
5. In Figure 6, it is shown that four (1/√π) areas come into close proximity with each other to form a (1/π) area or a 2D saddle APDSCRB. In fact, partial overlaps of the (1/√π) curves occur, and as shown in Figure 6, a significant pullback situation develops, causing the points X, X′, Y, and Y′ to be pulled inward and shifted to the points P, Q, R, and S, respectively, thus forming the saddle APDSCRB. The area of the 2D saddle [8] thus formed is (1/π).
6. Einstein postulated that somewhere in the universe, there does exist a point of singularity [14]. However, it was a qualitative statement, which originated from the high level of his intuitiveness [12]. Here, it is shown in the 'inverse space' that point O is the point of singularity, as all the forces are directed towards point O only (as shown by the arrows in Figure 6) [5]. In the recently discovered Theory of Space Quantization (TSQ) it has been shown that from the said point of singularity [11], the entire cosmological phenomena of the universe [7] have evolved.

A. Different Interpretations of π and (1/π)

- *Interpretation 1:* Regarding Figure 5, it should be noted that the space points along the diameter XX′ of the circle are in a state of certainty, but as soon as they move to the circumference of the circle, the positional uncertainty increases. Now, XX′ can be considered the bulk, and the circumference is the surface. Therefore, π can be interpreted as an index of:

'Push of the space points from bulk certainty to surface uncertainty' or 'the forward push forces of the universe' in the form of the quantum of the smallest possible volume of direct space.'

For the same reasoning as above but in the inverse sense, (1/π) is an index of:

'Pull of the space points from surface uncertainty to bulk certainty' or 'the backward pull forces of the universe' in the form of the quantum of the smallest possible volume of inverse space.'

- *Interpretation 2:* The forward push force, by which the space points from the bulk of direct space are driven to the surface of direct space (in the form of π or multiples of π), multiplied by the pull-back force, by which the space points from the surface of inverse space are driven toward the bulk of inverse space (in the form of the reciprocal of π or its multiples), is unity.

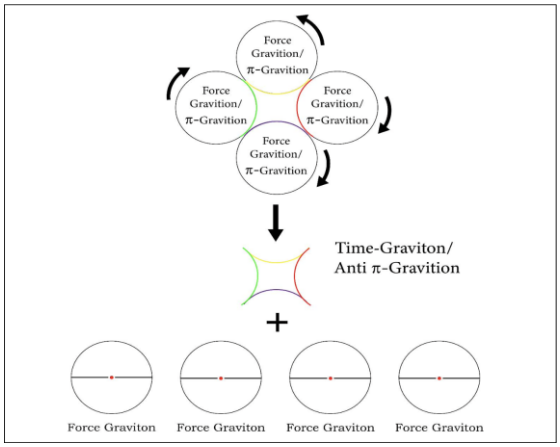
- *Interpretation 3:* The 'pressure,' P, of the hybridised space of the universe in a state of equilibrium is unity, since. P = [(push forward force, π) x (pull back force, 1/π) = 1. The pressure is a dimensionless parameter indeed. In the 'time-space' of the universe the above said equilibrium does persist but sometimes in a day the π –(1/π) equilibrium shifts to the right hand side or to the left hand side and as a result the pressure fluctuates (either P>1 or P< 1) and such fluctuations in pressure leads to the 'tides' in the rivers and oceans and as a result the water rises to high level when P>1 and the level falls when P<1.

- *Interpretation 4:* π is an expanding factor of linear space that is transformed into non-linear space or space with curvature. As shown in Figure 5, the points of the linear space (A, B, C, and D) are mapped to points on the curvature of the circle. For example, if we consider that throughout the length XX′ in Figure 5, there are n points in space and the radius is r, then the average distance between the space points is (r/n) [1]. When these points are shifted and placed on the circumference of the circle [14],

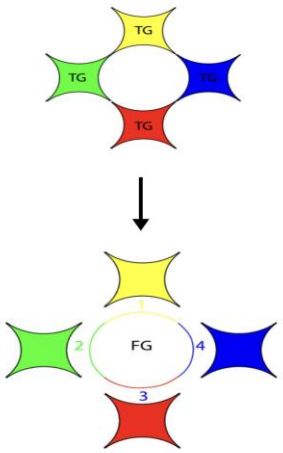
the average distance between the points becomes (πr/n), which is greater than (r/n)

[16]. Therefore, another definition of π in relation to the space points would be: π = (Average inter space points distance in the curved direct space)/ (Average inter space points distance in the linear direct space) (1/π) = (Average inter space points distance in the curved direct space)/ (Average inter space points distance in the curved indirect space) So π is the factor of the enlargement or expansion of direct linear space and (1/π) is the factor of the squeezing of the linear direct space [17].

- *Interpretation 5:* π and 1/π, being the universal space quanta of the universe, are interconvertible with each other. In Figure 7 below, from the topological orientations of four π quanta in space, one anti-π quantum is formed [6]. The corollary is also true: from the topological orientations of four anti-π quanta in space, one π quantum is formed [7].



[Figure 7 (a) Formation of π Quantum from Anti π Quantum] [7]



[Fig.7(b): Formation of π Quantum from Anti π Quantum in the Space] [7]

B. From the Very Ancient Days People Have Been Educated Mainly the Following Properties of π

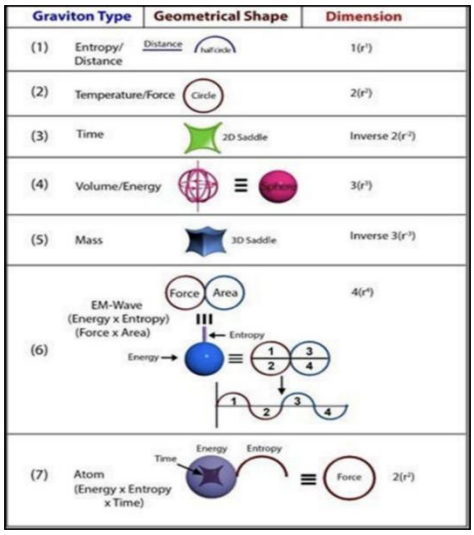
1. The parameter π is a universal constant in the fields of science, principally in mathematics, physics, and geometry.
2. The parameter π is irrational, and its value is 3.14159265359…; it is also a non-terminating, non-repeating decimal.
3. It is the ratio of the perimeter to the diameter of a circle, which always yields a non-converging value of 3.14159265359…
4. The half-circumference of a circle subtends an angle of π radians at the center of the circle (such that π radians = 180 degrees).

Regarding the π parameter, numerous discussions have been held in the past, many research papers published, and countless seminars organised. Various equations for π have been proposed over time, in all corners of the globe, to understand its origin and its mysterious non-converging character. This is, in fact, an endless exercise, and discussions are still ongoing to this day, but the mystery remains elusive.

The parameter π is a closely related, real-life constant of the universe, omnipresent and reminiscent of the eternal proverb, 'God is omnipresent.' The global scientific community has been fascinated by this god-like parameter, π, and honors it by observing a particular day each year as International π Day—March 14th.

The current research article reveals all the mysteries of π. The non-converging nature of π is deeply rooted in the geometry of the square root of π, as shown in Figure 2. The area under the curve in Figure 2 asymptotically extends to infinity, imparting the form of an irrational number. Since the square of any irrational number is always irrational, π, being the square of the square root of π, is also irrational. Similarly, the reciprocal of π (1/π) is also irrational, since the reciprocal of the square root of π is irrational as well (the reciprocal of any irrational number is always irrational). The circle shown in Figure 5 represents the smallest possible circle in the universe, with its radius considered to be unity. Similarly, the 2D saddle shown in Figure 6 represents the smallest 2D saddle in the universe, with its radius also considered to be unity.

[The π is the most fundamental quantum or packet (π quantum) of the following push forward quantum of the direct space of the universe (as shown in Figure 8)] [9].



[Fig.8: Geometrical Profile of the Space Quantum of the Universe] [9]

C. π Circles and Energy Continuum

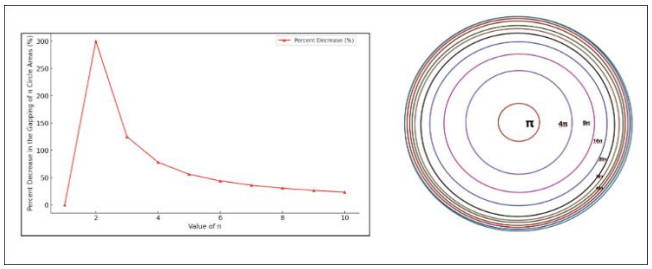
The space π circles formed from π cannot have radiuses (r) of any value of desire. The values of r have to be full integers like 1, 2, 3, 4, 5, 6 etc..since the lengths of the space (of all the direct space, inverse space and the hybridised space) are

quantized and the lengths cannot be a fraction. Niels Bohr proposed that the electrons cannot rotate around the nucleus in any orbit of their own choice but only in the selected orbits they can rotate and those are the quantized orbits. As a matter of fact what he had talked about is 'space quantization' but how and why space is quantized in the integral form of π (as described in the previous paragraph) could not be demonstrated by him. The mystery of space quantization is revealed and described in this article only for the first time in science through π 'space quantum'.

The following table shows how the energy levels increase from the smallest possible circle with an area of π ($\pi(1)^2$, where r is the radius of the smallest circle) to $\pi(2)^2$, $\pi(3)^2$, $\pi(4)^2$, $\pi(5)^2$, or 4π, 9π, 16π, 25π, and so on, up to $n^2\pi$, where n is an integer with values 1, 2, 3, 4, 5, etc.

Table-I: Percent Change of Gaping of the π Circles with Increase of n

Value of n	Value of n2(π)	Gap of the area of the circle over the previous value of n	Percent increase of grapping
1	*	-	
2	4π	3π	300%
3	9π	5π	125%
4	16π	7π	78%
5	25π	9π	56%
6	36π	11π	44%
7	49π	13π	36%
8	64π	15π	30.6%
9	81π	17π	26.5%
10	100π	19π	0.234



[Fig.9: Graphical Presentation of the Percentage Change of Gapping of the Area of the π Circle with Increase of n] [14]

From the data presented in Table1 and from the Figure 9 (Percentage decrease of gaping of the areas of the circles against the value of n) it is being clearly revealed that the gaping of the circles The energy decreases exponentially, and ultimately, the gap disappears. In the language of quantum physics, the energy levels of the electrons around the nucleus transition from quantized to a continuous state, or the energy levels become continuous from a state of 'discontinuous,' 'discrete,' or 'quantized.' The physical significance of the phenomenon is that higher energy levels cannot remain confined within a certain area or volume, as this would have led to the death of living organisms due to the high energy density. The spread of the higher energy levels must be greater so that their intensity is reduced at any point in space. This is why the 'energy density of space remains constant' [1]. This is also referred to as the safeguard of nature against the 'UV catastrophe' [14].

D. Simple Harmonic Motion and π

In Figure 5, the length OP is considered to be unity, representing the radius of the smallest circle. The space point O is at the bulk, and the point P is on the surface/circumference. Due to the angular force developed from point A, as shown in the figure, the space point O moves to position P, and point P reaches position S. Since the circumference of the circle is 2π (which is divided into 4 equal segments: PS, SR, RQ, and RP), the length of each segment is (π/2). Thus, the unit length of OP (the distance from the surface space point P to the bulk space point O) is transposed to a length PS [where length = (π/2), representing the distance between the two surface points P and S], and it becomes (π/2) times its original length. This effect is referred to as 'the surface-to-bulk certainty being transposed to surface-to-surface uncertainty of the space points.'

For the 2D saddle, as shown in Figure 6, by the same reasoning, this can be described as 'surface-to-bulk uncertainty being transposed to bulk-to-bulk certainty' [for the segments AQ and QO or DS and SO]. The effect of π is to increasingly randomise the space points, while the effect of (1/π) is to take the space points to an ordered arrangement, ultimately approaching 'singularity.'

In simple harmonic motion (the case of a horizontal pendulum), a π space quantum is responsible for the smallest possible oscillation of the pendulum. The first swing of the pendulum from its mean position is driven by the first angular force (say AP, as shown in Figure 5), which moves the pendulum bob from point P (the mean position) to position S (say extreme left). The next angular impulse of force, DS, brings the pendulum bob back to the mean position, where point S moves to point R. In the subsequent angular impulse, force CR moves the pendulum bob to the extreme right position, and point R reaches point Q. The final angular impulse brings the bob back to the mean position, and point Q returns to point P. This completes one full 'time period of oscillation' of the pendulum.

II. CONCLUSION

The following conclusions are being drawn:

1. There exist short-lived force impulses in direct space, in the form of the square root of π, which are Gaussian in nature. From the topological combinations of the four numbers of such impulses, the universal π parameter is formed in the shape of a circle.
2. The mechanism for the formation of circular quantum forces in the universe is revealed in the exercise conducted in this article, which was previously elusive.
3. There do exist short-lived inverse force impulses in the indirect or inverse space in the form of the square root of (1/π), which are also Gaussian in nature. From the topological combinations of the four numbers of such impulses, the universal (1/π) parameter is formed in the shape of a circle.
4. The mechanism of the formation of inverse circular quantum forces in the universe is revealed in the exercise conducted in this article, which was also elusive earlier.
5. The simple harmonic motion of a horizontal pendulum makes use of the four numbers of short-lived force impulses in direct space (in the form of the

square root of π) to complete one full cycle of evolution (T), which gives rise to the formation of the π space quantum. In other words, one π space quantum (which already exists in space) disintegrates and generates a full cycle of the pendulum's revolution. At the same time, due to this full oscillation, a π space quantum is evolved and subsequently put back into space. The principle of energy conservation is maintained in this manner. The moral of this phenomenon is that whatever quantum is borrowed from space to perform work (such as entropy quantum, force quantum, energy quantum, etc.) must be repaid to space. Similarly, if space borrows a quantum from a system, it repays it.

6. The physics of simple harmonic motion (such as the swinging of pendulums), as taught to students at the school and higher levels, must be updated immediately, as the current material being taught is largely abstract.

- The following concepts of conventional physics regarding the horizontal pendulum are contradictory:
- The velocity of the pendulum bob is maximum at the mean position.
- The accelerations of the pendulum bob (towards the mean position) are maximum at the extreme left and extreme right positions, respectively.

The contradictory nature of the above two statements lies in the fact that for each swing of the pendulum (a. mean position to extreme left, b. extreme left to mean position, c. mean position to extreme right, and d. from extreme right back to the mean position), the angular forces of exactly the same magnitude are acting. Hence, in each swing, the pendulum sweeps out the same volume of space and moves with the same velocity throughout its movement. This suggests that the simple harmonic motion of a pendulum is quantized, not continuous. Therefore, applying Newton's laws of motion (which are valid for continuous motion) and using equations such as Force = mass x acceleration to derive the kinetic equations of motion of a pendulum are not justified. This new approach needs to be discussed.

7. The non-converging character of π originates from the topology or geometry of the infinitely spread, short-lived force pulses of the universe in the form of the square root of π, and this non-converging character is retained in the value of π as well.

DECLARATION STATEMENT

After aggregating input from all authors, I must verify the accuracy of the following information as the article's author.

- **Conflicts of Interest/ Competing Interests:** Based on my understanding, this article has no conflicts of interest.
- **Funding Support:** This article has not been funded by any organizations or agencies. This independence ensures that the research is conducted with objectivity and without any external influence.
- **Ethical Approval and Consent to Participate:** The content of this article does not necessitate ethical approval or consent to participate with supporting documentation.
- **Data Access Statement and Material Availability:** The adequate resources of this article are publicly accessible.
- **Authors Contributions:** Each author has individually contributed to the article. Great Idea given by Dr. Chinmoy Bhattacharya and synopsis, conceptualization, methodology, writing and critical thinking done by Nishant Sahdev.

REFERENCES

1. Bhattacharya C (2020) Novel Quantum Gravity interpretation of Chemical Equilibrium, Free Energy, Dark Energy and Dark Matter of the Universe. Advances in Theoretical & computational physics 3(3): 86-95. DOI: https://dx.doi.org/10.33140/ATCP
2. Bhattacharya C (2020) Novel Quantum Gravity Approach to Evaluate The Dimensionalities and the Geometrical Profiles of the Chemical Reactions. International Journal of Scientific & Engineering Research 11 (4):373-391. https://www.ijser.org/researchpaper/NOVEL-QUANTUM-GRAVITY-APPROACH-TO-EVALUATE-THE-DIMENSIONALITIES-AND-THE-GEOMETRICAL-PROFILES-OF-THE-CHEMICAL-REACTIONS.pdf
3. Bhattacharya C (2020) Cosmology and Unified Quantum Gravity Theory of the Universe. Advances in Theoretical & Computational Physics. 3(3): 114-211. DOI: https://dx.doi.org/10.33140/ATCP
4. Bhattacharya C (2020) Unified Quantum Gravity Theory Driven Concepts of the Classical Laws of Physics, the Dark Energy, the General Theory of Relativity and the 'Zero-Energy Universe'. Advances in Theoretical & Computational Physics 3(4): 265-286. DOI: https://dx.doi.org/10.33140/ATCP
5. Bhattacharya C (2021) Novel Quantum Gravity Model of the Physics of Operability of Galvanic Cells and Electrical Power Generation. Advances in Theoretical & Computational Physics 4(1): 7-13. DOI: https://dx.doi.org/10.33140/ATCP
6. Bhattacharya C (2023) TTQG (Topological Theory of Quantum Gravity) Driven New Theory of colour Physics. Advances in Theoretical & Computational Physics 6(1): 1-9. DOI: https://dx.doi.org/10.33140/ATCP
7. Bhattacharya C (2023) Reformulating the Basics of Conventional Newtonian Physics, Quantum Physics and the Einstein Theories of Relativities Based on the newly discovered Topological Theory of Quantum Gravity (TTQG). Physical Science and Biophysics J 7(1): 1-23. https://medwinpublishers.com/PSBJ/reformulating-the-basics-of-conventional-newtonian-physics-quantum-physics-and-the-einstein-theories-of-relativities-based-on-the-newly-discovered-topological-theory-of-quantum-gravity-ttqg.pdf
8. Bhattacharya C (2023) The Newly Discovered Topological Theory of Quantum Gravity (TTQG) - a Multi block Compatibilizer Cum Modifier of the Existing Theories of Physics, Cosmology, Quantum Mechanics and Quantum Computing. Global Journal of Science Frontier Research 23(a4): 13-58. https://journalofscience.org/index.php/GJSFR/article/view/102674
9. Bhattacharya C (2024) Theory of Space Quantization and the Quantum Level Understanding of the True Logics of the Principles of Thermodynamics and Heat Engines. Global Journal of Science Frontier Research: A Physics and Space Science, (LCC): QC174.17. https://globaljournals.org/GJSFR_Volume24/2-Theory-of-Space-Quantization.pdf
10. Bhattacharya C (2024) Theory of Space quantization (TSQ) Driven Version of the Conventional Theories of Physics, Relativity, and Gravitation - A Concise Report. Open Access Journal of Astronomy (OAJA)" Medwin Publishers, DOI: 10.23880/oaja-16000134. https://medwinpublishers.com/article-description.php?artId=13353
11. Bhattacharya C (2024) Embodying the Abstract 'Time Variable' of the Universe through Thermodynamics and the Theory of Space Quantization (TSQ). Open Access Journal of Astronomy (OAJA), DOI: https://doi.org/10.23880/oaja-16000142.
12. Propp, J. (2021). The Square Root of Pi. *Math Horizons*, *28*(3), 14–17. https://www.jstor.org/stable/48664731
13. Lord Kelvin, & Tait, P. G. (1902). *Mathematical and physical papers* (Vol. 5). Cambridge University Press. https://archive.org/details/mathematicalphys05kelvuoft
14. Einstein, A. (1915). The Field Equations of Gravitation. In *The Collected Papers of Albert Einstein* (Vol. 6, Doc. 25). Princeton University Press. https://einsteinpapers.press.princeton.edu/vol6-trans/129
15. Einstein Albert (1916) "The foundation of the General Theory of Relativity Annalen

Der Physik 354 97:769. DOI: http://dx.doi.org/10.1002/andp.19163540702

16. Tandon, R. (2019). Bianchi Type V Universe and Bulk Viscous Models with Time Dependent Gravitational Constant and Cosmological Constant in General Relativity. In International Journal of Engineering and Advanced Technology (Vol. 9, Issue 1s3, pp. 251–256). DOI: https://doi.org/10.35940/ijeat.a1048.1291s319
17. More, R. (2024). Exploring Mathematical Models of Dark Energy: A Comprehensive Literature Review. In International Journal of Basic Sciences and Applied Computing (Vol. 10, Issue 10, pp. 1–4). DOI: https://doi.org/10.35940/ijbsac.k0522.10100624

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Nishant Sahdev is a distinguished researcher in Theoretical Physics and currently serves as a Research Affiliate at the University of North Carolina at Chapel Hill, United States. With extensive national and international experience at prestigious institutions, Nishant's academic journey spans Delhi Technological University, New Delhi, India, and the University of Debrecen, Hungary. His work is based on quantum gravity, cosmology, and dark matter, contributing to the development of a unified quantum gravity theory and an innovative space quantization model. Nishant has published extensively in leading scientific journals and has further honed his expertise in advanced mathematics during research training at King's College London, England. Dedicated to expanding the frontiers of scientific knowledge, Nishant's current work focuses on pioneering theories and equations that challenge conventional understanding. Beyond his academic pursuits, he is also a passionate romance writer and a columnist for national newspapers, seamlessly blending science with creative expression.