The Double-slit Experiment in The Six-dimensional Space-Time

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Abstract

Young's two-slit test can be interpreted over time. Classical events have a quantum behaviour over time. Based on the findings of this research, Quantum Phenomena have a classical interpretation. The role of time has been neglected in the understanding of quantum mechanics phenomena. By examining classical events over time, Quantum Phenomena were simulated. Entanglement, particle-wave phenomenon, etc. are intertwined in the space-time structure. The role of the arrow of time in solving physics problems can be considered.

Keywords: Double-slit experiment, Quantum mechanics, Six-dimensional space-time.

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1. Introduction

Thomas Young's two-slit experiment shows that the particle-wave properties are inseparable. However, there is evidence to reject this assumption. [1] The building blocks of the universe cannot be unreal. The reason for the existence of wave-particle phenomena is measurement. [2] The arrow of time plays a fundamental role in quantum mechanics. Accordingly, the measurement depends on the passage of time. [3]. The six-dimensional space-time theory is based on the passage of time. and can investigate the effective role of measurement in quantum mechanics phenomena.[4][5]. based on the matter of EPR, confirms Einstein's opinion and expresses a classical description of the phenomenon of entanglement in six-dimensional space. The practical application of this theory in transferring information based on brain entanglement confirms experimental observations. The practical use of this theory in transferring information based on entanglement in the brain expresses experimental observations in confirmation of this theory. [6]. New and advanced experiments of Young's double-slit phenomenon reveal illogical results such as particle self-awareness. However, the new and advanced tests of Young's double gap phenomenon show more complex results, which show the impact of information as a fact in the structure of the world. [7][8][9][10]. Accordingly, Information can be considered as an equivalent of energy. [11] On this basis analyzing the particle-wave phenomenon in the double-slit experiment within six-dimensional space-time, it is possible to determine the precise location of the particles accurately.

2. Methods

A classical particle can pass through two paths at two different times. Figure1

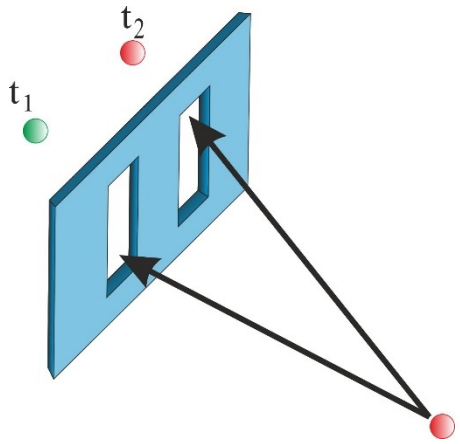

Figure 1: A classical particle in the macroscopic world can pass through two gates over time.

Wave behavior and wave function can be observed by observing all possible possibilities of a classical event. (2.1) Figure 2

$$\int_{-\rho}^{+\rho}\int_{-t}^{+t}\int_{-\infty}^{+\infty}|\psi(\rho,t,x)|^2 d\rho dt dx = 1 \qquad 2.1$$

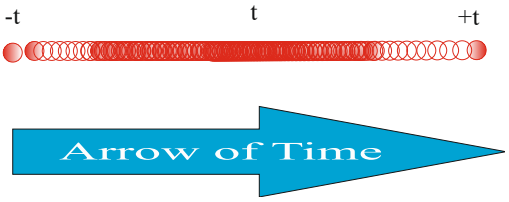

Figure 2: The possibility of observing a classical event over time can explain the wave nature of quantum particles.

A Möbius strip is a two-dimensional space that has a three-dimensional structure—figure 3. The reason for the existence of Möbius space is rotation in the space structure. The presence of heterogeneity in an expanding bubble causes tension and as a result rotation—figure 4. Dimensions of Matter have a lower few than space-time. Matter creates heterogeneity in the structure of expanding space-time. The tension and stress applied to the material explain the reason for Planck's constant, gravitational constant, etc. (2.2) Figure 5

$$\pi^3 r^5 \in \left(\frac{1}{6}\right)\pi^3 r^6 \quad , \quad \ln(\varphi) \approx \left(\frac{1}{2}\right)^6 \pi^3$$

$$\left(\frac{\left(\frac{tan^{-1}(\varphi)-\left(\frac{180}{\pi}\right)}{2\pi}\right)^3\left(\frac{1}{6}\right)\pi^3}{c}\right) = 6.6765834 \times 10^{-11} \cong G \qquad 2.2$$

$$\frac{\left(\left(\frac{1}{2\pi}\right)^3 + \left(\frac{1}{2}\right)^6 \pi^3 e^{tan\left(\frac{180}{\pi}\right)}\right)^2}{c^4} = 6.5693903027 \times 10^{-34} \cong h$$

$$\left(\frac{\left(\frac{3\pi-6}{2\pi}\right)^2\left(\frac{\pi\varphi}{3}\right)^2}{c^4}\right) = 1.05597784887 \times 10^{-34} = \hbar \quad , \quad \left(\frac{90-{}^{180}/_{\pi}}{1\div 6}\right) = \left(\frac{3\pi-6}{2\pi}\right)$$

$$h^2 G^2 e^{(\varphi)^2\pi^3} = \Lambda$$

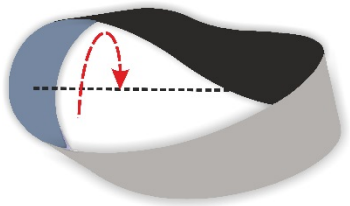

Figure 3: It is impossible to create a Möbius strip in 3D space without rotating it.

Figure 4: Surface inhomogeneities cause rotation on the surface of an expanding bubble.

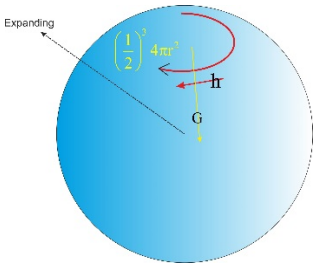

Figure 5: The rotation and tension that occur result in the creation of fundamental constants.

3. Results

When the photons were fired separately into the two slits. The sum of the photons on the screen displayed a wave-like behavior. The cause of this phenomenon is rotation in the structure of space and time. Picture 6. (3.1)

$$\int_{-\rho}^{+\rho}\int_{-t}^{+t}\int_{-\infty}^{+\infty}|\psi(\rho,t,x)|^2 d\rho dt dx = 1 \quad , \quad |\Psi\rangle = b_1|\tilde{\psi}_1\rangle + b_2|\tilde{\psi}_2\rangle + \cdots + b_n|\tilde{\psi}_n\rangle$$

$$|\tilde{\psi}\rangle = \alpha_1|A_1\rangle + \alpha_2|A_2\rangle + \alpha_3|A_3\rangle + \alpha_4|A_4\rangle + \alpha_5|A_5\rangle + \alpha_6|A_6\rangle$$

$$b_\mu = x_\mu + ti \ , \quad X_\mu = (x_1, x_2, x_3, x_4, x_5, x_6) \Rightarrow b_\mu {b_\mu}^* = (\tfrac{1}{3}) \qquad 3.1$$

$$\int_0^{2\pi}|\psi(x,t))|^2 dx = 1 \rightarrow \frac{2\pi}{6} \Longrightarrow \left\{\left(\frac{\pi}{3}\right) + i\left(\frac{2\pi}{3}\right)\right\}, \left\{\left(\frac{2\pi}{3}\right) + i\left(\frac{4\pi}{3}\right)\right\}, \{(\pi) + (i)\}, \left\{\left(\frac{4\pi}{3}\right) + i\left(\frac{5\pi}{3}\right)\right\}, \left\{\left(\frac{5\pi}{3}\right) + i(1)\right\}, \{(2\pi) + i(2\pi)\}$$

$$A_1 = \pm\left(\frac{\pi}{3}\right) + iz, A_2 = \pm\left(\frac{2\pi}{3}\right) + iz, \ A_3 = \pm(\pi) + iz \ , A_4 = \pm\left(\frac{4\pi}{3}\right) + iz, \ A_5 = \pm\left(\frac{5\pi}{3}\right) + iz, A_6 = \pm(2\pi) + iz,$$

$$\sigma = 1,2,3,4,5,6$$

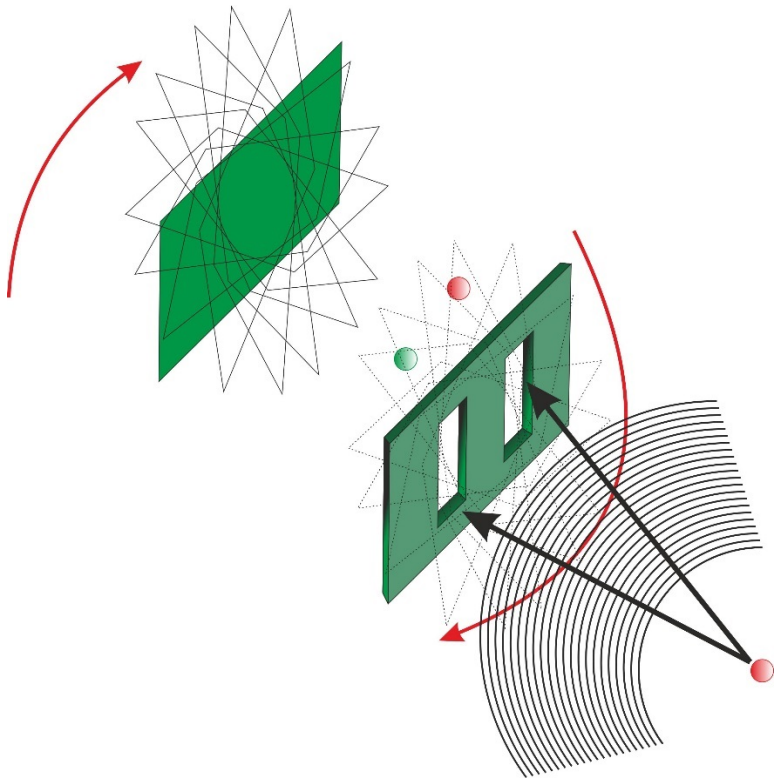

Figure 6: Every object has spin over time. The distance between the curtain and the slit, as well as the role of the spin of the curtain and the slit itself, and the firing of individual photons and the point of impact, are effective. "The wave property is an inherent part of the fabric of space-time."

The spin of any object depends on the density and speed of that object. (3.2)

$$\eta = \sin\left(cos^{-1}\left(\frac{\Delta x}{c}\right)\right),\ \ \mu = \cos\left(cos^{-1}\left(\frac{\Delta x}{c}\right)\right.$$

$$v \to x_i \Rightarrow \xi = \sin\left(cos^{-1}\left(\frac{\Delta x}{c}\right)\right) + \sin\left(cos^{-1}\left(\frac{\Delta y}{c}\right)\right) + \sin\left(cos^{-1}\left(\frac{\Delta z}{c}\right)\right)$$

$$t = \frac{t_0}{\xi} \equiv t = t_0\sqrt{1 - \frac{2GM}{rc^2}} \Rightarrow c\left(\eta^2{}_1 + \eta^2{}_2 + \eta^2{}_3\right) = r_{x,\rho}c \Rightarrow \sin\left(\cos^{-1}\left(\frac{\sqrt{2GM}}{c\sqrt{r}}\right)\right) \equiv sin\phi$$

$$t = \frac{t_0}{\eta}\ ,\qquad l = \frac{l_0}{\eta}\ ,\qquad m = \frac{m_0}{\eta}\quad m^t = \frac{h\nu}{c^2}\ ,(\ \rho c)^{\frac{1}{2}} = \Delta\acute{x}\ ,r_{x,\rho} = \Delta x + \Delta\acute{x}\ ,$$

$$(m^t + m_x) = \frac{m^t}{\eta}\ \to sin\theta = \frac{m^t}{m^t + m_x} \qquad\qquad 3.2$$

$$(\rho c) = \Delta\acute{x}^2\ ,\qquad \left(\frac{c}{\rho}\right) = \Delta\acute{t}^2$$

$$\rho = \left(\frac{m^t}{2\pi^2 r^3}\right)\ ,m/\rho = \frac{2\pi^2 r^3}{\eta}$$

$$\Delta t^2 + \Delta x^2 = c^2 \qquad ,\theta = \left(cos^{-1}\frac{\Delta x}{c}\right) \quad ,\theta + \phi = 90^{\circ}$$

Figure 7 shows the relationship between mass, density, time, and space in the Fourier transform. (3.3)

$$\psi(x,t,\rho) = a_0 + \sum_{n=1}^{\infty}\left[a_n cos\left(cos^{-1}\frac{\Delta x}{c}\right) + b_n sin\left(cos^{-1}\frac{\Delta x}{c}\right) + c_n cos\left(cos^{-1}\frac{\Delta \acute{x}}{c}\right) + d_n sin\left(cos^{-1}\frac{\Delta \acute{x}}{c}\right) + e_n cos\left(cos^{-1}\frac{\Delta t}{c}\right) + f_n sin\left(cos^{-1}\frac{\Delta t}{c}\right)\right]$$

$$\psi(x,t,\rho) = \sqrt[6]{\frac{1}{Ae^{b\phi}}}\int_{-\rho}^{+\rho}\int_{-t}^{+t}\int_{-\infty}^{+\infty}\gamma(k)e^{-ikx}e^{-ik\rho}e^{-ikt}dxd\rho dt \qquad 3.3$$

$$\lambda = \frac{h}{P}$$

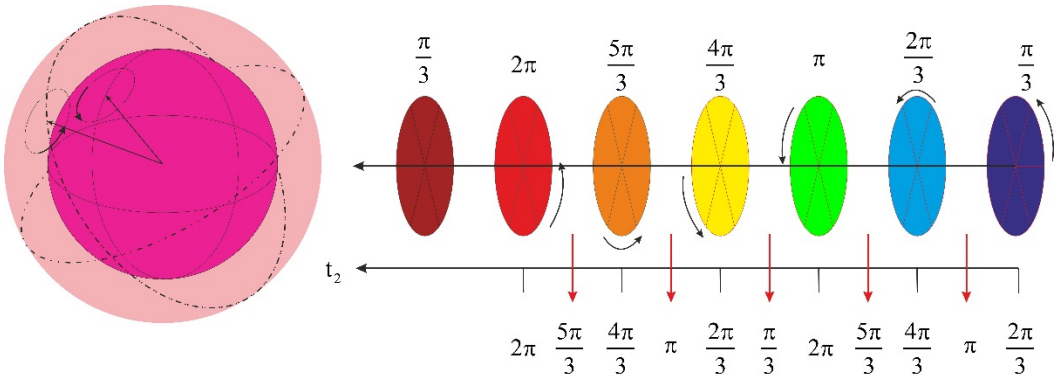

Figure 7: The density is a length in space-time that rotates around the mass field. As the speed of the object increases, the density length and the mass field of the object change.

Intertwining is woven into the structure of space-time. Violation of Bell's inequality is definite over time. (3.4)

$$|\gamma\rangle = c_0|a_0\rangle + c_1|a_1\rangle \ , \quad |\tau\rangle = d_0|b_0\rangle + d_1|b_1\rangle$$

$$|\gamma\rangle\otimes|\tau\rangle = (c_0d_0|a_0\rangle|b_0\rangle + c_0d_1|a_0\rangle|b_1\rangle) + (c_1d_0|a_1\rangle|b_0\rangle + c_1d_1|a_1\rangle|b_1\rangle)$$

$$|00\rangle = \begin{bmatrix}1\\0\\0\\0\\0\\0\end{bmatrix}, |01\rangle = \begin{bmatrix}0\\1\\0\\0\\0\\0\end{bmatrix}, |10\rangle = \begin{bmatrix}0\\0\\1\\0\\0\\0\end{bmatrix}, |11\rangle = \begin{bmatrix}0\\0\\0\\1\\0\\0\end{bmatrix}, |01\rangle = \begin{bmatrix}0\\0\\0\\0\\1\\0\end{bmatrix}, |00\rangle = \begin{bmatrix}0\\0\\0\\0\\0\\1\end{bmatrix}$$

$$|\tilde{\psi}\rangle = \alpha_1|A_1\rangle + \alpha_2|A_2\rangle + \alpha_3|A_3\rangle + \alpha_4|A_4\rangle + \alpha_5|A_5\rangle + \alpha_6|A_6\rangle$$

$$b_1 = cos\left(\frac{\theta}{2}\right) \ , \ b_2 = e^{i\Phi}sin\left(\frac{\theta}{2}\right) \ , \sqrt{1-\frac{v^2}{c^2}} = sin\left(cos^{-1}\left(\frac{v}{c}\right)\right) = sin\theta \ , v \equiv \Delta x$$

$$\Delta x^2 \equiv (\rho c) \Rightarrow \rho \equiv E \equiv \theta, \Phi$$

$$\int_0^{2\pi}|\psi(x,t))|^2dx = 1 \rightarrow \frac{2\pi}{6} \Longrightarrow \left(\frac{\pi}{3}\right), \left(\frac{2\pi}{3}\right), (\pi), \left(\frac{4\pi}{3}\right), \left(\frac{5\pi}{3}\right), (2\pi) \qquad 3.4$$

$$A_1 = \pm\left(\frac{\pi}{3}\right), A_2 = \pm\left(\frac{2\pi}{3}\right), \ A_3 = \pm(\pi) \ , A_4 = \pm\left(\frac{4\pi}{3}\right) \ , \qquad A_5 = \pm\left(\frac{5\pi}{3}\right), A_6 = \pm(2\pi),$$

$$|\Psi\rangle = b_1|0\rangle + b_2|1\rangle \Rightarrow |\Psi\rangle = b_1|0\rangle + b_2|1\rangle + b_3|0\rangle + b_4|1\rangle$$

$$\Longrightarrow \frac{1}{\sqrt{2}}(|00\rangle + |11\rangle$$

$$|\eta\rangle = z_0|a_0\rangle + z_1|a_1\rangle + \acute{z_0}|a_0\rangle + \acute{z_1}|a_1\rangle\,, \quad |\mu\rangle = d_0|b_0\rangle + d_1|b_1\rangle + \acute{d_0}|b_0\rangle + \acute{d_1}|b_1\rangle$$

$$|\eta\rangle\otimes|\mu\rangle = (z_0 d_0 \acute{d_0}\acute{z_0}|a_0\rangle|a_0\rangle|b_0\rangle|b_0\rangle + \cdots$$

$$\Rightarrow (A_1 + B_0)\alpha + (A_0 + B_1)\beta - (A_1 + B_1)\gamma \leq 2$$

$$|\langle(A_1 + B_0)\alpha + (A_0 + B_1)\beta - (A_1 + B_1)\gamma\rangle| \geq 2 \qquad 3.4$$

$$cos^2\left(\frac{\pi}{3}\right) = \frac{1}{4} \;\Rightarrow Same\ \ result \leq \frac{1}{3}$$

Factors affecting particles in quantum mechanics are determined by the comprehensive equation. This equation is also accurate on large scales. (3.5)

$\mu, \nu = 1,2,3,4,5,6$

$$\Psi_{\mu\nu} + R_{\mu\nu} - \tfrac{1}{2}Rg_{\mu\nu} + \Lambda g_{\mu\nu} = \left(\tfrac{\pi-2}{2}\right)^6 \left(\tfrac{he}{c}\right) T_{\mu\nu} + K_{\mu\nu} \qquad 3.5$$

Wave tensor. (3.6)

$$\boldsymbol{\Psi_{\mu\nu}} = \begin{bmatrix} \boldsymbol{cos^2\theta\ cos^2\phi} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} \\ \boldsymbol{A_\iota} & \boldsymbol{cos^2\phi} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} \\ \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{e^{-i\pi\varphi}} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} \\ \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{e^{i\pi\varphi}} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} \\ \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{sin^2\theta} & \boldsymbol{A_\iota} \\ \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{A_\iota} & \boldsymbol{sin^2\theta\ sin^2\phi} \end{bmatrix} \qquad 3.6$$

$$\boldsymbol{A_\iota} = \pm\left(\tfrac{\boldsymbol{\pi}}{\boldsymbol{3}}\right), \pm\left(\tfrac{\boldsymbol{2\pi}}{\boldsymbol{3}}\right), \pm(\boldsymbol{\pi})\ , \pm\left(\tfrac{\boldsymbol{4\pi}}{\boldsymbol{3}}\right)\ , \pm\left(\tfrac{\boldsymbol{5\pi}}{\boldsymbol{3}}\right)\ ,\ \pm(\boldsymbol{2\pi}),\ \boldsymbol{\iota = 1,2,3,4,5,6}$$

Electromagnet tensor and momentum and energy tensor. (3.7)

$$K_{\mu\nu} = \begin{bmatrix} \frac{r_t}{\pi c} & A_\iota & A_\iota & A_\iota & A_\iota & A_\iota \\ A_\iota & \frac{r_t h e^{\pi^3}}{c} & A_\iota & A_\iota & A_\iota & A_\iota \\ A_\iota & A_\iota & \frac{r_t\sqrt{G} h e^{\varphi^2}}{c} & A_\iota & A_\iota & A_\iota \\ A_\iota & A_\iota & A_\iota & \frac{\sqrt{G}}{r_x} & A_\iota & A_\iota \\ A_\iota & A_\iota & A_\iota & A_\iota & \frac{\sqrt{G}}{r_x} & A_\iota \\ A_\iota & A_\iota & A_\iota & A_\iota & A_\iota & \frac{\sqrt{G}}{r_x} \end{bmatrix} \qquad T_{\mu\nu} = \begin{bmatrix} -\rho & 0 & 0 & 0 & 0 & 0 \\ 0 & -\rho & 0 & 0 & 0 & 0 \\ 0 & 0 & \rho & 0 & 0 & 0 \\ 0 & 0 & 0 & P & 0 & 0 \\ 0 & 0 & 0 & 0 & P & 0 \\ 0 & 0 & 0 & 0 & 0 & P \end{bmatrix} \qquad 3.7$$

Einstein's six-dimensional tensor(3.8)

$$G_{\mu\nu} = \begin{bmatrix} \frac{10}{r^2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{4}{r\ cos^2\phi} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{4}{r\ cos^2\theta cos^2\phi} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{4}{r\ cos^2\theta cos^2\phi} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{4\,sin^2\theta}{r\ cos^2\theta cos^2\phi} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{4\,sin^2\theta\ sin^2\phi}{r\ a\ cos^2\theta cos^2\phi} \end{bmatrix} \quad 3.8$$

and six-dimensional spacetime metric (2.11)

$$g_{\mu\nu} = \begin{bmatrix} ra^2cos^2\theta\ cos^2\phi & 0 & 0 & 0 & 0 & 0 \\ 0 & r^2a^2cos^2\theta & 0 & 0 & 0 & 0 \\ 0 & 0 & r^2a^2 & 0 & 0 & 0 \\ 0 & 0 & 0 & a^2r^2 & 0 & 0 \\ 0 & 0 & 0 & 0 & a^2r^2sin^2\theta & 0 \\ 0 & 0 & 0 & 0 & 0 & a\ r^2sin^2\theta\ sin^2\phi \end{bmatrix} 3.9$$

Equation (3.5) in the subject of the information, based on the law of equivalence of information and energy, leads to the M-A equation. (3.10) This equation describes the complex behavior of the brain such as self-awareness.[12]

$\eta c = \Delta t \quad , \quad \mu c = \Delta x \quad \Rightarrow \Delta x^2 + \Delta t^2 = c^2, \quad \Delta x^2 \equiv \rho c$

$\Rightarrow (\rho c) = \Delta \acute{x}^2 \ , \qquad \left(\frac{c}{\rho}\right) = \Delta \acute{t}^2$

$P^2 = m^2v^2 \equiv Data^2 \frac{\Delta \rho c}{\Delta t^2} \Rightarrow \Delta t^2 = \frac{1}{\rho c} \Longrightarrow P^2 = \ D^2(\pm x^2\pi^2 i^4 c^2)$

$E = mc^2 \Rightarrow E = Dc^2 \Rightarrow Dc^2 = h\nu = \rho|\tilde{\psi}\rangle$

$G_{\mu\nu} + \Lambda g_{\mu\nu} = I_{\mu\nu}$

$\Psi_{\mu\nu} + I_{\mu\nu} = \left(\frac{\pi-2}{2}\right)^6 \left(\frac{he}{c}\right) T_{\mu\nu} + K_{\mu\nu}$ 3.10

Accordingly, when photons move individually towards two slits. They hit points on the screen that have a certain order over time. Figure 8

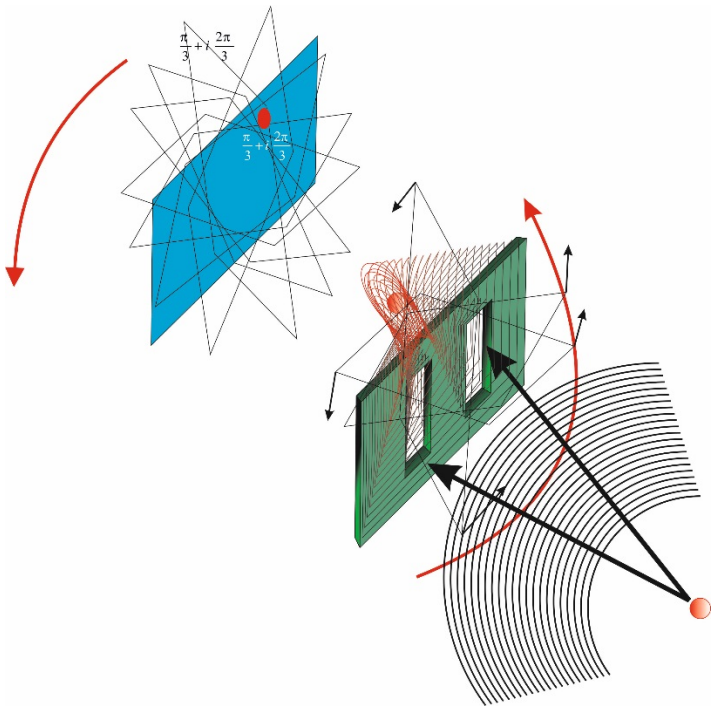

Figure 8: Although it seems that there is no logical connection between the collision points in the separate emission of photons. But there are logical relationships between the collision points, like the test of Buffon's needles.

As a result of this insight, it is suggested to investigate the relationship between time, mass of the test tool, and collision points in the Double-slit Experiment.

4. Discussion

New and advanced experiments in Yang's two-slit phenomenon indicate the existence of a wave-particle property in space-time. Density is like a length that oscillates and rotates around the mass field in space. As the speed of the object increases, the radius of the field also changes. Due to the existence of two perpendicular time vectors, each object has a wave function and a wavelength over time. The wave behavior of particles is caused by the presence of particles in time dimensions. The repeating states of the wave function represent the wave behavior of particles in Young's experiment with individual particles. The foundation of quantum mechanics is based on the principle of uncertainty. While the latent variables are in the space-time expanding structure. Particles are units that carry information over time. This information depends on the momentum and density of the object. Can the principle of equivalence of information and energy state that information is converted into energy? Tensor 3 shows that the information hidden in the geometric structure of space-time can create other properties of particles such as the electromagnetic field, which explains the interaction of other fundamental forces of nature. As a result of this theory, we can understand the deep connection between electromagnetism and gravity, and this connection can be investigated and tested directly.[13]

Conflicts of interest

The author reports no conflicts of interest. The author alone is responsible for the content and writing of this article.

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