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What does the Wave Function Represent?

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Abstract- As was Einstein s original idea we suppose that the speed of light is altered in the presence of mass by a change in its dielectric susceptibility. Our explanation of the phenomena of quantum mechanics is a continuation of Einstein search for hidden variables. Mass induces a curvature in spacetime. This has two effects. New volume is created and this would mean that there is not exactly a point particle but matters in a way occupies some volume. Another result is that spacetime becomes cyclic and quantities like the action are quantized because they depend on angles through which the observer witnesses the events.

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Strictly as per the compliance and regulations of:

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I. Introduction

There are plenty of reports in the scientific literature [1,2,3,4,5] regarding a possible interpretation of the wave function as a spacetime wave. The recent trend is to adopt a fifth axis of imaginary time. In that case this axis would have blurred past and future. This would help explain the ability of the wave particle to foresee which trajectory it is going to follow. The scientists also report on closed time like curves as solutions of general relativity. We give a different explanation by assuming closed spacetime curves in our work[6,7,8,9]

II. Main Part

Action is defined as:

$$S = \int \boldsymbol{p}\, d\boldsymbol{q} = \int mc^2 d\tau \qquad (1)$$

In equation (1) p is the momentum and q is the coordinate. Tau is the element of spacetime. Through a transformation the cyclic coordinates are used in what is called angle variables and then the action is defined as:

$$S = \oint p dq \qquad (2)$$

In our case of interest, that is in quantum mechanics we know that momentum is defined as ih times the gradient of psi, the wave function. We shall use equation (2) and implicate it to find action around a closed loop which may be the orbit of the particle. The only difference is that we are going to multiply by the complex conjugate of psi:

$$S = \oint \psi^* \nabla\psi d\vec{l} = \iint \vec{\Omega}\, d\vec{S} = \oint |\psi|^2\, d\phi = K\delta\tau = \delta\Omega \qquad (3)$$

In equation (3) we define as the vorticity Omega the following:

$$\vec{\Omega} = \frac{d\vec{F}}{dV} \times \frac{d\vec{r}}{dt} = \nabla \times \vec{J} \qquad (4)$$

So in short description what is happening is that the flux of vorticity even when taken through a closed surface is equal to the area of that psi describes in the complex plane of psi=a+ib which in turn equals to the change in spacetime value and the solid angle of the observer.

Next we represent some relationships we have discovered to hold true and which will be necessary:

$$dS = \frac{\hbar}{mN} dmdV = \frac{dm}{dV} dV^2 = dPdV = dTdS \qquad (5)$$

In equation (5) S on the left stands for action and indeed the S on the final right member of the equation stands for entropy.

The other useful formula is the following one:

$$\frac{\hbar^2}{2mN} \Delta|\psi|^2 = \frac{VdP}{dV} = \frac{|\psi|^2 V}{N^2} mc^2 = \hbar \frac{dm}{d\tau} = mc^2 \frac{d\Omega}{dV} = \frac{dL}{dV} \qquad (6)$$

In equation (6) Omega stands for the solid angle of spacetime. As we have mentioned in our previous work during the absorption of a photon from the atom a quantum thermodynamic engine is working which transforms the transverse photon which is a surface phenomenon to a longitudinal wave of polarization in which case we have dilation and rarefaction of the volume. The coefficient of efficiency is:

$$\eta = K \frac{dV}{dS} = \frac{E-U}{E} \qquad (7)$$

In equation (7) S stands for surface and K is the constant curvature of the space which is induced by the mass and is the inverse of the relativistic radius of the atom.

We conclude from the aforementioned that by combining equations (6) and (3) we get an extra formula regarding the cyclic procedure:

$$\oint |\psi|^2 d\phi = K\delta\tau = \delta\Omega = \oint \frac{VdP}{mc^2} \qquad (8)$$

Yet another useful formula from previous work [10] which we are going to apply is the following:

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$$\frac{\hbar}{m}\nabla\phi = \frac{d\vec{r}}{dt} \quad (9)$$

Equation (9) is valid in the absence of magnetic field and this case we are going to study for simplicity. The other useful outcome of our research is that the spacetime distorted by the mass becomes fluid. The following equation is valid then:

$$\frac{d\phi}{dt} = \frac{\hbar}{m}\nabla\phi \cdot \frac{d\vec{r}}{dt} = \frac{dr^2}{dt^2} \rightarrow d\phi dt = dr^2 \quad (10)$$

Spacetime metric is altered because the speed of light changes in the presence of mass as was Einstein s original idea. Inserting the dielectric susceptibility chi it becomes:

$$d\tau^2 = dr^2 - \frac{c^2}{\chi}dt^2 \quad (11)$$

Multiplying equation (11) by psi squared and taking a closed integral around a loop we find out that action may be quantized because the solid angles are periodic with period 4pi:

$$\oint|\psi|^2\left(\frac{d\tau}{dt}\right)^2 dt = \oint|\psi|^2 d\phi - \oint\nabla(\Delta|\psi|^2)d\vec{r} = K\delta\tau = \delta\Omega \quad (12)$$

From equation (12) we deduce that:

$$\frac{dS}{dt} = |\psi|^2\left(\frac{d\tau}{dt}\right)^2 \quad (13)$$

$$\oint dS = \delta\Omega \quad (14)$$

III. Discussion

It is one of the results of the implementation of general relativity that angles are quantized around a massive object. Our system differs from general relativity although we foresee curvature of spacetime in that in quantum mechanics force is the gradient of the potential energy rather than mass times acceleration. Besides it is the very fact that we have a variable mass that distinguishes this system.

We still have not precisely answered the question of what is the wave function. We believe, that as is being dictated by a rich literature it is possible that we may have a blurring of the axes with an imaginary component of time. If there is a fifth (non existing) imaginary axis of imaginary time then the complex conjugate of the wave function would proceed backwards in time. This may be seen for example by following the fact that momentum changes to negative by psi star and goes back. By taking the radial Schrodinger equation and applying vector calculus we find:

$$-\frac{\hbar^2}{2m}\Delta(\psi\vec{r}) = \frac{l(l+1)}{2mr^2}\psi\vec{r} \quad (15)$$

Equation (15) gives a picture of what may be happening. The radius vector is waving under complex multiplication with psi. General relativity foresees that a spinning object would attract space time like a warp.

IV. Results

Quantum mechanics describes a thermodynamic system inspired by the principles of general relativity. We give a possible answer to the long search for the quantum of action. After all h bar does have dimensions of action and angular momentum. The careful reader may observe that the talk is not only on closed loops but the same loop may be trans versed the other way since the phase is not single valued and we may have flux of vorticity through a closed surface. Indeed if there is a surface charge and mass as described by a polarization we should have vorticity flow.

We hope we have contributed to the field of research of hidden variables in quantum mechanics.

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