THE ESSENCE OF QUANTUM MECHANICS

Chapter belongs to the "Theory of Space"
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7.1 PRECESSION OF A SPACE CHANNEL VS.DE BROGLIE WAVES

We known from previous chapters that a moving space channel deforms boundary hypersurfaces, therefore, it moves in a resultant motion, oscillating around an equilibrium position[1].

An axis, inclined at the angle $\Theta_{v0} = \arcsin \beta$ to the versor ${}^{\beta}\hat{n}$, is the equilibrium position for a space channel connecting different mirror spaces and moving at a velocity of v.

Precession of a space channel which moves around an equilibrium position has led physicists to believe that what they deal with is a wave of matter with a de Broglie wavelength:

$$\lambda = \frac{h}{p} \qquad h = 6{,}626 * 10^{-34}\, Js \tag{1}$$

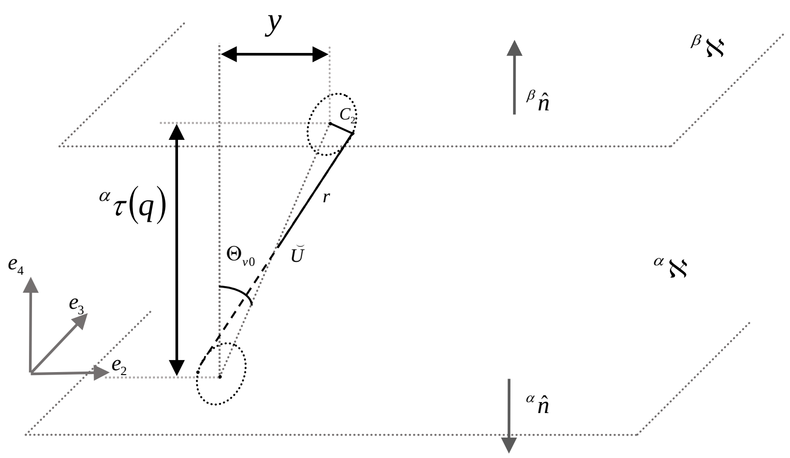

FIG. 1

Also known is the principle of uncertainty (indeterminancy), or Heisenberg's relation, which is expressed by the following formula for momentum and position:

$$\Delta p_y \Delta y \geq \frac{h}{4\pi} \tag{2}$$

According to the Theory of Space, the uncertainty or indeterminancy discovered by Heisenberg results from incorrect measurements on three-dimensional physical quantities of four-dimensional objects of which the motion consists of complex oscillations around the equilibrium position Θ_{v0}.

Moreover, it is hard to imagine accurate measurements of a space channel by means of three spatial coordinates.

[1] See Chapter VI.

This very fact explains the infinities which are present in Heisenberg's relation in the case when the infinity of one physical quantity (operators of such physical quantities do not commute) is equal to zero.

To determine the distance between the boundary hypersurfaces, let us consider the space channel $\breve{U}$ which moves at a velocity $\vec{v} = ve_2$.

The channel $\breve{U}$ oscillates around the equilibrium position Θ_{v0} [2] (see: the figure above).

Indeterminancy of the position of y can be found from the following equation:

$$\frac{y}{{}^{\alpha}\tau(q)} = tg\Theta_v \tag{3}$$

, hence:

$$y = tg\Theta_v {}^{\alpha}\tau(q) \tag{4}$$

Therefore:

$$\frac{\partial y}{\partial \Theta_v} = \frac{{}^{\alpha}\tau}{\cos^2 \Theta_v} \tag{5}$$

Assuming that angular velocity is constant, it is possible to select appropriate velocities of a space channel thus causing a situation when the amplitude C_2 is equal to one-half of the wavelength C_2:

$$C_2 = \frac{\lambda}{2} \Leftrightarrow v = \frac{2C_2}{T} \tag{6}$$

Likewise, for any selected k:

$$kC_2 = \frac{\lambda}{2} \Leftrightarrow v = \frac{2kC_2}{T} \tag{7}$$

Hence:

$$C_2 = \frac{\lambda}{2k} \tag{8}$$

Using the approximations established in chapter 6.1 (390) and (396):

[2] See Chapter VI.

$$C_2 \approx \frac{2}{3}{\Theta_{v0}}^3 * \bar{s}$$
$$\omega \approx \frac{2\pi m_0 v^2}{h\sqrt{1-\beta^2}} \quad \textbf{(9)}$$
$$T \approx \frac{h\sqrt{1-\beta^2}}{m_0 v^2}$$

, in which $\bar{s}$ denotes 1[m], we have:

$$v = \frac{2kC_2}{T} = \frac{4km_0 v^2}{3h\sqrt{1-\frac{v^2}{c^2}}}{\Theta_{v0}}^3 \bar{s} = \frac{4km_0 \frac{v^2}{c^2} c^2}{3h\sqrt{1-\frac{v^2}{c^2}}} \arcsin^3 \frac{v}{c} \bar{s} \quad \textbf{(10)}$$

After expanding into a Maclaurin series for $\frac{v}{c}$:

$$v = \frac{4km_0 c^2 \bar{s}}{3h}\left(\frac{v^5}{c^5} + O\left(\frac{v}{c}\right)^7\right) \approx \frac{4km_0 c^2}{3h}\frac{v^5}{c^5}\bar{s} = \frac{4km_0}{3hc^3} v^5 \bar{s}$$
$$v = \sqrt[4]{\frac{3hc^3}{4km_0 \bar{s}}} \quad \textbf{(11)}$$

For instance, for $k = 1$ we have a velocity of:

$$v = \sqrt[4]{\frac{3hc^3}{4m_0 \bar{s}}} = \sqrt{\frac{3*6{,}626*10^{-34}*c^3}{4*9{,}109*10^{-31}}} \approx 0{,}00116c = 348.583{,}6\frac{\mathrm{m}}{\mathrm{s}} \quad \textbf{(12)}$$

In the amplitude C_2 equation, we have the dependence on the de Broglie wavelength, which is equal to:

$$\lambda = \frac{h}{p} = \frac{h}{m_0 \gamma v} = \frac{h\cos\Theta_v}{m_0 c \sin\Theta_v} = \frac{h}{m_0 c} ctg\Theta_v \quad \textbf{(13)}$$

After substituting in the amplitude formula, we have:

$$C_2 = \frac{1}{2k}\frac{h}{m_0 c} ctg\Theta_v \quad \textbf{(14)}$$

Directly from the figure (41) we can see that can be assumed $C_2 \leq y$ what leads us using (463) and (474) to the following inequities:

$$C_2 \leq {}^{\alpha}\tau * tg\Theta_v \qquad (15)$$

$$\frac{1}{2}\frac{h}{m_0 c} ctg\Theta_v \leq {}^{\alpha}\tau * tg\Theta_v \qquad (16)$$

$${}^{\alpha}\tau \geq \frac{1}{2}\frac{h}{m_0 c}\frac{1}{tg^2\Theta_v} \approx \frac{1}{2}\frac{h}{m_0 c}\frac{1}{\Theta_v{}^2} \qquad (17)$$

Using equation (472) we have:

$${}^{\alpha}\tau \geq \frac{1}{2}\frac{h}{m_0 c}\frac{1}{tg^2\Theta_v} \approx \frac{1}{2}\frac{h}{m_0 c}\frac{1}{\Theta_v{}^2} \qquad (18)$$

Transforming the equation (472) we have:

$$v^4 = \frac{3hc^3}{4m_0 \bar{s}} \qquad (19)$$

$$\frac{v^4}{c^4} = \sin^4\Theta_v \approx \Theta_v{}^4 \approx \frac{3hc^3}{4m_0 \bar{s}} \qquad (20)$$

Substituting obtained result to the inequality on ${}^{\alpha}\tau$ we have:

$${}^{\alpha}\tau^2 \geq \frac{1}{4}\frac{h^2}{m_0{}^2 c^2}\frac{4m_0 \bar{s}}{3hc^3} \qquad (21)$$

$${}^{\alpha}\tau^2 \geq \frac{1}{3}\frac{h\bar{s}}{m_0 c} \qquad (22)$$

Ultimately, the distance the boundary hypersurfaces ${}^{\alpha}\tau$ satisfies the inequality:

$$\boxed{{}^{\alpha}\tau \geq \sqrt{\frac{1}{3}\frac{h\bar{s}}{m_0 c}}} \qquad (23)$$

After substituting in the equality above:

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$$h = 6{,}626 * 10^{-34} Js$$
$$c = 299.792.458 \frac{m}{s} \tag{24}$$
$$m_e = 9{,}109 * 10^{-31} kg$$

, we obtain:

$$\boxed{{}^{\alpha}\tau \geq \sqrt{\frac{1}{3} 2{,}426386755 * 10^{-12} m^2} \approx 8{,}94 * 10^{-7} m = 0{,}894 \mu m} \tag{25}$$

7.2 THE ESSENCE OF QUANTUM MECHANICS

Quantum mechanics uses the oscillations of moving space channels, while approximating them by means of a wave function with wavelengths found using the de Broglie equation.

Furthermore, it is only concerned with standing waves. Freely moving particles are no exception from that rule because a wave function is required to be normalized.

From the point of view of the Theory of Space, standing waves are stable states of the motion of space channels in which they oscillate around equilibrium positions.

For illustration, let us imagine that a space channel circulates around the nucleus of a hydrogen atom, oscillating around an axis inclined at the angle Θ_{v0}.

Assuming that, after one turn around the nucleus of a hydrogen atom, the space channel has not completed the full number of oscillations around the axis inclined at the angle Θ_{v0}, we conclude that disturbances of space surrounding the nucleus of a hydrogen atom will start to interact with one another, leading to a change in the orbit of the space channel.

This means that, quite rightly, wave functions are referred to as states in quantum mechanics. In fact, they are discrete states and, in certain unique cases, i.e., in solid bodies, they are able to from continuous bands.

In other words, such states are merely the possible stable trajectories of elementary particles, and the nature of their stability consists in that disturbances of space on closed trajectories in every circulation will hit exactly the same phase of disturbances of space, thus avoiding self-interactions, which would otherwise cause a change in the trajectory.

Summing up, quantum mechanics factorizes the real configurational space with integrals of motion[3], which appear to be wave functions[4].

However, quantum mechanics has a more serious problem: it constructs the configurational space of particles based on a three-dimensional space. For instance, the configurational space for two particles is the Cartesian product $E^3 \times E^3$.

Let us note that, from the Theory of Space it follows that the turn of an elementary particle in a four dimensional space, for instance, around the invariant subspace $L(e_1, e_4)$ passing through the middle of a space channel leads to the change of the particle into its antiparticle.

It appears that quantum mechanics is capable of investigating even that type of cases with the use of the principle of charge continuity.

Summing up, it is to be stated unambiguously that profound changes in quantum mechanics are required in the following areas, to name a few:

- method to form configurational space,
- method to construct wave functions,
- operators corresponding to physical quantities,
- equations which describe interactions.

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[3] The issue addressed is the extended notion of the integrals of motion which depend on starting conditions.

[4] Quantum mechanics is not taking all types of oscillations of a space channel around its equilibrium position into consideration, as revealed by theory TP.

The issue will be tackled in more detail in our subsequent papers.

7.3 ENTANGLED STATES

Entangled states confirm the validity of the Theory of Space and prove that, in certain conditions, difficulties connected with the measurement of an oscillating space channel can be overcome.

It needs to be stressed, that the Bell inequality cannot be met, because quantum mechanics in its present form cannot correctly describe even a single elementary particle. The reason for this is failure to take into account the complex structure of elementary particles, the four–dimensional structure of space, and oscillations of all of the space channels which the particle is made of.

In conclusion, proving the mystical teleportation of quantum states basing on probability theory, which incorrectly assumes that all states of the system[5] are known, only aims to defend the doctrines of contemporary quantum mechanics.

[5] The key to understand Bell inequities is to observe, that they are based on probability, which incorrectly states that all of the elementary states of the system are known, which is wrong considering the complex nature of elementary particles and space revealed by the TP theory.