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SPATIAL INTERPRETATION OF A. EINSTEIN'S ENERGY EQUATION

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Keywords: Einstein's theory, macro objects, micro systems, mass and energy.

It is known that A. Einstein's theory is well applicable for macro objects. However, for micro systems it does not give valid results. Quantum theory is used for such systems. It is based on a probabilistic approach to determining the state of a microparticle. Apparently, this is where the contradictory theories lie. On the one hand, the deterministic energy equation, and on the other, the De Broglie and Heisenberg equations.

The totality of all physical processes is described by four interrelated components – energy, substance (matter), space, time.

In the energy equation

$$E = m c^2 . \quad (1)$$

ENERGY SUBSTANCE TIME

As you can see, there is no space component in the structure of the equation.

On the other hand, quantum theory is based on the De Broglie equation and the Heisenberg uncertainty relation. It is believed that the wave and corpuscular properties of an object complement each other. The connection between waves and particles can only be described statistically – the square of the amplitude of a wave at a given location in space determines the intensity of the wave and the probability of finding a particle at that location. Moreover, the probability of finding a particle is maximum where the amplitude of the particle is maximum. The Heisenberg uncertainty relations are universal. They are performed whenever an attempt is made to measure precise position or momentum. However, refining the position leads to an increase in the inaccuracy of the pulse, and vice versa. Note that at low energies, the De Broglie wavelength will be very small. So, in optics, at small wavelengths, wave properties can be neglected and the concept of a light beam can be used. Thus, in quantum mechanics at small wavelengths, the wave properties are insignificant and therefore the motion can be described by a trajectory.

At the same time, quantum mechanics establishes strict rules by which to determine which variables are complementary and which are joint.

In quantum mechanics, the division of total energy into kinetic and potential does not make sense, since the first depends on the momentum, and the second on the coordinates.

From the above brief critical analysis it can be seen that quantum mechanics is a set of postulates that determine the experience of determining the properties of a micro-object.

Based on the unity of physical nature, it is of interest to create such a theory that was equally applicable to both macro and micro systems.

Consider the energy equation (1) as applied to a hydrogen atom – a nucleus and one electron. Using the classical model, we will consider a nucleus with a diameter $d_н$, located inside a sphere with a diameter ds – the diameter of the electron orbit.

The electron energy will be determined by equation (1). However, his position will not be determined by the probability of his position. At the same time, it will necessarily be in a spherical region with a thickness of (*dн* - *ds*) / 2. The mass of an electron is known, its charge is known. Thus, it can be argued that the energy of the electron is in this spherical space. The volume of this space

$$Vo = \frac{4}{3}\pi\left(\frac{d_s - d_e}{2}\right)^3. \quad (2)$$

Returning to equation (1) and dividing the left and right sides by V_o, then

$$\frac{E}{V_o} = \frac{m}{V_o}C^2. \quad (3)$$

It is obvious that on the left side we got the specific energy of space ($\frac{E}{V_o}$), and on the right side $\frac{m}{V_o}$ the ratio is the density of matter for a space with a volume V_o.

From (3) it can be seen that the greater the density of matter, the greater the specific energy. Indeed, the more electrons there are in a spherical shell, the greater the density of matter in it. Accordingly, each of them carries an elementary charge, therefore, the more of them, them more energy.

Further, at a constant mass, an increase in V_o (expansion of space) leads to a decrease in specific energy. And vice versa. Compression of space, its high density.

They talk about high specific energy.

The developed approach should be considered legitimate also because so far it has not been possible to "see" the electron. Experiments only fix a certain energy in a certain space. However, one should not belittle the importance of the planetary model of the atom (the nucleus around which the electron rotates) should not be. However, the concept of an electron is inextricably linked with some space around the nucleus, which is determined by the energy level.

It is known that an electron can move from one energy level to another. In this case, the energy difference is $\Delta E = E_2 - E_1$, for such a transition

$$\Delta t \Delta E \geq h. \quad (4)$$

Where Δt is the duration of the time interval in which this transition occurred, but not the duration of the transition itself.

In the case of the transition of an electron in an atom from state E_2 to state E_1, due to the finite width of the energy level of the excited atom. $\Delta E \neq 0$ In this case, is the lifetime of an atom in an excited state relative to the transition from E_2 to E_1.

We emphasize once again that deviations in the measurements of the position and momentum of an object are not ordinary measurement errors that do not allow fixing the measured quantities with a certain accuracy. The theory explains this by the quantum mechanical nature of the object. But the researcher himself endowed the object with these properties, taking a quantum mechanical model for research. Moreover, the measuring device it-

self is a quantum mechanical object. The parameters characterizing its dynamic state are precisely determined by the uncertainty relations. It is obvious that a certain vicious circle is obtained.

Similar reasoning can be carried out for other atoms with different shell shapes. Given that they are not spherical, it is necessary to correctly determine the space in which the electron is located.

Thus, expression (3) rewritten as

$$E_v = \rho_м C^2 . \quad (5)$$

where E_v is the specific energy of space, and $\rho_м$ – is the density of matter in this space, allows you to combine energy, space, time and matter into a single pattern.

Where should further research be directed?

Apparently, first of all, it is necessary to estimate the geometric volumes of the energy shells. After that, determine the corresponding specific energy and identify their maximum and minimum values. Then, compare them with macro objects. There may not be a direct correspondence here, but the scale can be identified.

Similarly, investigate the density of matter in the shells and compare with the values $\rho_м$ of macroobjects. Scale factors can also be identified here. The values.of these scales can reveal a regular relationship between E_v and $\rho_м$.

Conclusion

An improved Einstein equation has been obtained, containing the relationship between energy, space, matter (matter) and time. It is obtained by passing to relative values E_v and $\rho_м$. (related to the corresponding space) – the specific energy and density of the substance.

The application of the developed approach will allow obtaining scale factors for micro and macro objects. Their existence is a sign of the unity of the laws of the universe. On the other hand, this will make it possible to apply the similarity theory in the study of new objects. The numerical values of the specific energy and density of matter for well-studied objects can become criteria for determining the properties of the objects under study.

In general, the proposed approach is new. Its application can correct known ideas about physical objects and avoid uncertainty for micro systems.

Bibliography

The publication does not contain references to sources, since the equations and provisions used are fundamental and are contained in any reference book on physics.

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ПРОСТОРА ІНТЕРПРИТАЦІЯ РІВНЯННЯ ЕНЕРГІЇ А. ЕЙНШТЕЙНА

Відомо, що теорія А.Ейнштейна хорошо застосовується для макрооб'єктів. Однак, для мікро систем вона не дає дійсних результатів. Сукупність фізичних процесів

описується чотирма взаємопов'язаними складовими – енергія, речовина (матерія), простір, час.

У структурі рівняння енергії відсутня складова простору. Виходячи з єдності фізичної природи, цікавить створення такої теорії, яка була однаково застосовна як до макро, так і мікро систем.

Запропоновано інтерпретацію цього рівняння, що містить обсяг простору з певною масою і енергією. Отриманий вираз, що містить питому енергію простору, і щільність матерії у цьому просторі, дозволяє об'єднати енергію, простір, час і речовину в єдину закономірність. Визначено напрями перспективних досліджень із використанням розробленої інтерпретації рівняння енергії.

Ключові слова: теорія Ейнштейна, макрооб'єкти, мікросистеми, маса та енергія.

Анипко О.Б.

ПРОСТРАНСТВЕННАЯ ИНТЕРПРИТАЦИЯ УРАВНЕНИЯ ЭНЕРГИИ А. ЭЙНШТЕЙНА

Известно, что теория А.Эйнштейна хорошо применима для макро объектов. Однако, для микро систем она не дает действительных результатов. Совокупность всех физических процессов описывается четырьмя взаимосвязанными составляющими – энергия, вещество (материя), пространство, время. В структуре уравнения энергии отсутствует составляющая пространства. Исходя из единства физической природы, представляет интерес создание такой теории, которая была равно применима как к макро, так и микро системам.

Предложена интерпритация этого уравнения которая содержит объем пространства с определенной массой и энергией. Полученное выражение, содержащее удельную энергию пространства, и плотность материи в этом пространстве, позволяет объединить энергию, пространство, время и вещество в единую закономерность. Определены направления перспективных исследований с использованием разработанной интерпритации уравнения энергии.

Ключевые слова: теория Эйнштейна, макрообъекты, микросистемы, масса и энергия.

Oleg B. Anipko

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It is known that A. Einstein's theory is well applicable for macro objects. However, for micro systems it does not give valid results. The totality of all physical processes is described by four interrelated components – energy, substance (matter), space, time. There is no space component in the structure of the energy equation. Based on the unity of physical nature, it is of interest to create such a theory that was equally applicable to both macro and micro systems.

An interpretation of this equation is proposed which contains the volume of space with a certain mass and energy. The resulting expression containing the specific energy of space, and the density of matter in this space, allows you to combine energy, space, time and matter into a single pattern. The directions of perspective researches are determined using the developed interpretation of the energy equation.

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