THE PHYSICAL PHENOMENA CAUSED BY JOINT ACTION OF THE LAW OF PRESERVATION OF THE CENTRE OF GRAVITY AND DEPENDENCE OF BODY MASSES ON THEIR ENERGY

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The majority of physicians recognizes today one of the basic statements of the theory of a relativity about direct proportionality of mass and energy of a body. It is done even by those scientists, who reject other postulates and conclusions of the theory of a relativity, explaining relativity effects by nontraditional methods. However while studing many phenomena and theoretical problems we periodically come across the question, whether the measure of inertia of bodies besides their energy also experiences influence of forces, acting in them. Let's imagine two similar absolute rigid rods which move with a similar speed v along the axes X. One of them is in the state of free flight and therefore is not compressed. The other is inserted with its front end into the friction clutch, and with its back end - into a source of energy wich pushes it through the friction clutch and creates in the rod the compressing force F. Due to great rigidity of rods their internal energy practically does not depend from F, i.e. is the same in both of the rods. Nevertheless there are many reasons that kinetic energy and pulse of the compressed rod greatly differ from an unintense one and the this example - towards the greater value.

The official physics hold in this problem vague position wich, in some way, is typical of our time. It created the mathematical apparatus on the basis of classical considerations about mechanical tension and modern relativity. From this fact it follows, that actually mechanical tension, i.e. the forces acting in bodies, can essentially influence on their pulse and kinetic energy, even changing the sign of the latter into the negative sign /1,2/. But no physical model allowing to be guided in complicated situations to solve the problem approximately or even in general to expect result, was offered. By its presentation this section of a science greatly yields to the basic postulaten of the theory of a relativity created by Einstain. The situation is complicated also by the fact that it is possible experimentally to determine energy or pulse of objects being in close interaction with other objects only with the help of additional considerations or axioms, which are not obviously stated. That's why today it is possible to speak only about more or less coordinated approach, which results in conclusion rather likely not contradicting each other . They are very important for some sections of classical electrodynamics and number of other sections of physics. In this connection we decided at any rate partially to clear this problem on simplier and at the same time some urgent examples. Thus for simplification of a statement and reducting the calculations, we shall use representations of material objects which don't have mass, but wich are absolute rigid, i.e. have infinite Young's modulus. The authors bear the full responsibility for the fact, that these simplifications don't effect for final results of the present work.

Let there is a device consisting of a source of energy on the left and the receiver of energy on the right, removed at a long distance L along an axis X and fastened with each other by the rigid weightless cylinder of the same length.. Thus, distance between a source and receiver will be always constant. The source can be a mechanical engine capable to create force along an axis X, which will push or stretch a weightless rigid rod, transferring energy into the receiver. Accordingly, the receiver can be friction clutch transforming mechnical energy of the source into heat with the help of forces of friction . If there is no transfer of energy from a source into the receiver , the device, including a source, receiver and cylinder, connecting them, will be at rest. However if to begin transferring energy, the device in the whole will move from right to left, as only in this case it will be possible to preserve a centre of gravity of the closed system. But the rod transferung the energy can move in any direction along axis X. Really, condition for preserving the centre of gravity in each given moment of time:

$$m_1 \cdot L_1 = m_2 \cdot L_2 \quad \text{or} \quad w_1 \cdot L_1/c^2 = w_2 \cdot L_2/c^2 \qquad (1)$$

Where m_1 and w_1 - mass and energy of a source of energy;
m_2 and w_2 - mass and energy of the receiver of energy;
L_1 - distance from a centre of gravity of system up to a centre of gravity of a source of energy;
L_2 - distance from a centre of gravity of system up to a centre of gravity of the receiver of energy.
In a differential type, a condition of preservation of a centre of gravity:

$$\partial(w_1 \cdot L_1)/\partial t=\partial(w_2 \cdot L_2)/\partial t \qquad (2)$$

$$-\partial w_1/\partial t=\partial w_2/\partial t;\ L_1+L_2=L=\text{const};\quad m_1+m_2=m=\text{const}$$

From here follows:

$$m \cdot v =(L\cdot\partial w_1/\partial t) / c^2 \qquad (3)$$

Where m - mass of the whole system (device);

v - speed of device in the whole;

$\partial w_1/\partial t$ - flow of energy from a source into the receiver.

If the transferring the energy from the source to the receiver is carried out by the commpressed rod,

$$m \cdot \mathbf{v} =F\cdot L\cdot \mathbf{v_ш} /c^2 \quad (4)$$

Where $\mathbf{v_ш}$ - speed of movement of a rod transferring energy into the friction clutch.

It is useful to pay attention to the fact that the sign of the product $\cdot F\cdot v_ш$ does not depend on a direction of movement of a rod. If the rod is pushed into the friction clutch, it experiences compressive forces, and if it is pulled out, it experiences stretching forces. Thus, at changing the sign of $v_ш$, the sign of F automatically varies, and the direction of a flow of energy from a source in the receiver remains constant.

Thus, if in the compressed rigid rod, transferring energy from one end of system to another is moving in the closed system to preserve the centre of gravity of system we should suppose the presence on the rod a pulse:

$$\mathbf{P}_ш= F\cdot L\cdot \mathbf{v_ш} /c^2 \quad (5)$$

The sign F in (5) is positive, if the rod is compressed and is negative, if it is stretched.

Let's consider now question about kinetic energy of the compressed rod, transferring energy from a source in the receiver inside the closed system. Thus the rod is considered as ideal with infinite speed of an establishment of a stationary state, that corresponds to its absolute rigidity. By virtue of preservation of energy the total energy of a source, receiver and rod should be at every given moment of time identical. From the source at the beginning of experiment energy $F\cdot v_ш\cdot t_э^I$ released, where $t_э^I$ - time of experiment by the left clock on the rod. For this time energy $F\cdot v_ш\cdot t_э^{II}$ shoud go into the receeiver, where $t_э^{II}$ - time of experiment by the right clock. For the observer moving together with a rod, i.e. being at restn relative to the rod, $t_э^I = t_э^{II}$ as he synchronized the clock himself establishing $t_э^I = t_э^{II}$. However for the laboratory observer $t_э^I \neq t_э^{II}$ according to known considerations of the theory of a relativity. If the rod moves from left to right,

$$t_э^I - t_э^{II} = - v_ш\cdot L / c^2, \quad (6)$$

but if it moves from right to left,

$$t_э^I - t_э^{II} = v_ш\cdot L / c^2 \qquad (7)$$

The formula (6) designates, that from the point of view of the laboratory observer the receipt of energy in the receiver will begin later on value $\Delta t =v_ш\cdot L / c^2$, than the energy releasing from a source. Therefore fer preservation of general energy of sistem the rod should increase the energy by value:

$$W_ш= F\cdot L\cdot v_ш^2 / c^2 \qquad (8)$$

The formula (7) on the contrary means, that the allocation of heat in friction clutch , i.e. receipt of energy in the receiver, will begin in opinion of the laboratory observer earlier, than its leaving from a source by value $\Delta t =v_ш\cdot L / c^2$. Therefore for preservation of general balance of energy in this case it is necessary to give the rod negative:

$$W_ш= - F\cdot L\cdot v_ш^2 / c^2 \quad (9)$$

We shall remind, that the choice of a sign in (8) and (9) occurs automatically, as during the movement of the rod from the source into the receiver it is compressed, i.e. $F> 0$. Duringthe movement from the receiver in the source the rod is stretched and $F < 0$.

Thus, the rigid rod, transferring energy inside the closed system, has energy, which can be either positive, if the rod is compressed, or negative, if it is stretched.

So, we came to a conclusion, that by the laws of preservation of energy and centre of gravity in the closed system, and also in view of usual relativity difference in time in different inertial systems, which is a basis of the theory of Einstein, we should allocate with an additional pulse and additional energy those moving bodies, to which are enclosed external forces causing in them mechanical tension And to do this is necessary even when the external forces do not change in any way properties of bodies at rest. The physical nature of these additional characteristics to our mind essentially differs from traditional representations about pulses and energies, however their use allows to take into account that the change of dynamic characteristics of investigated bodies is not now frequently done in general, namely changing dynamic characteristics of investigated bodies, at a complete constancy of their static characteristics. Physical necessity itself and algorithm of introducting of the discussed characteristics are clear, as they are a consequence of the basic laws (postulates) of physics.

Let's consider in the conclusion a known example about the Truton-Noble condenser , which finds a satisfactory explanation only at use of the fact stated above. Truton and Noble in the beginning of the 20-th century have paid attention to the fact that energy $W_ш$ and pulse $\mathbf{P}_к$ of fields in a gap of the flat condenser, moving in vacuum, essentially depend on its orientation relative to the direction of movement /3,4/. It could be to explained by existence of ether and thus to find out it experimentally. However numerous experiments were finished unsuccessfully. In the result there appeared the known paradox, which till now is discussed in literature and at physical seminars /5/. As a matter of fact at the absence of ether or basic impossibility to find it out with the help of the condenser, energy and pulse of the latter should depend only on the electrical field in the condenser and speed of its movement, i.e. should differ from energy and pulse of fields in the condenser. So , if we calculate mechanical forces arising in details of the condenser at creation in it a field, and then by the formulas (5), (8) and (9) we shall calculate additional pulses and energy of these details, the sum of the fields energies and additional energies of mechanical tension in the moving condenser will appear tobe the same at its any orientation. That will refer the sum of pulses as well:

$$W_к = E^2 \cdot V / 8\pi \cdot (1-v^2/c^2)^{0,5} \qquad (10)$$

$$\mathbf{P}_к = E^2 \cdot V \cdot \mathbf{v} / 8\pi \cdot (1-v^2/c^2)^{0,5} \cdot c^2 \qquad (11)$$

Here E - tension of electrical field in condenser;

V - condenser's volume.

The values $W_к$ from (10) and $\mathbf{P}_к$ (11) precisely correspond to the known Einstein's formulas , connecting a pulse and energy of movement of bodies and energy of their rest. These formulas by the structure and physical contents do not provide dependence $W_к$ and $\mathbf{P}_к$ on orientation.

In the conclusion we shall note, that use of representations about additional pulses and energies of the mechanically intense details is the only way of elimination of this paradox and similar to it provided that we completely trust the formulas for energy and pulses of fields. The official science has gone just by this way.

The other opportunity is redefinition of concepts about energy and pulses of fields in such a way that there were additional characteristics of forces acting inside the fields at what in due time aimed Maxwell . Such variant from the mathematical party is quite possible), but it requires radical changes almost of all electrodynamics, that apparently is not caused by necessity.

The list of the literature

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