International Journal of Scientific Research and Management (IJSRM)
||Volume||08||Issue||06||Pages||AA-2020-20-24||2020||
Website: www.ijsrm.in ISSN (e): 2321-3418
DOI: 10.18535/ijsrm/v8i06.aa01

The Phenomenon of Mass

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Abstract
The concept of mass is one of the most fundamental in the whole of physics. Here it is shown that every mass is temporal, i.e. a mass could not exist without the flow of time. The close connection between mass and time is examined in more detail. This connection is used to prove that the special theory of relativity is wrong. Furthermore, mass is considered in relation to its gravitational effect. In the two-mass system, the change in the energy of the gravitational field when a mass moves is described. In the end, the connection between universal mass decay and gravity is established.

Keywords: Mass, Mass Decay, Time, Time Dilation, Gravitation

Introduction

Time exists only because it changes. If mass is also something that exists only through its own change, then all mass-affected objects must change constantly and everywhere.

This novel perspective on the concept of mass is to be opened here. The proof shall be given that a world cannot exist without change, because time would stand still and mass would not come into existence. Every change is a change in mass-bearing objects.

1. The Connection between Mass and Time

What does change mean? Changing in the physical sense means structural change. A mass cannot change without changing its structure. Every structural change can be described as a surface change and every surface change takes time, it is temporal.

$$m = -\frac{1}{c^2}\frac{dm}{dt}\frac{dA}{dt} \qquad (01)$$

This formula for mass, which is a differential equation, is fundamental for understanding nature [1.]. It is valid for the everyday decay of any mass as well as for the increase in mass due to velocity caused by gravity. From this equation the known conservation of momentum for a two-mass system could be derived [2.].

The differential dA/dt describes the structural change in matter and can be interpreted as information. So there is not only a mass-energy equivalent, but also a time-information equivalent:

$$\frac{dA}{dt} = I = tc^2 \quad ® \qquad (02)$$

If the mass increases due to speed, a structure is formed when time is taken up. Therefore time passes more slowly on the increased mass. From (01) and (02) follows:

$$\frac{dm}{m} = -\frac{dt}{t} \qquad (03)$$

The solution of equation (03), which makes every mass and time change calculable, is done by integration.

The integration limits are defined here between the rest state a and the moved state b. In principle they could also be defined between two age states of space:

$$\int_{m_a}^{m_b}\frac{1}{m}dm = -\int_{t_a}^{t_b}\frac{1}{t}dt \qquad \ln m\Big|_{m_a}^{m_b} = -\ln t\Big|_{t_a}^{t_b} = \ln t\Big|_{t_b}^{t_a} \qquad (04)$$

With the integration limits used, the following results:

$$ln\, m_b - ln\, m_a = ln\, t_a - ln\, t_b \qquad (05)$$

The further simplification leads to the universal expression, which is also valid in quantum physics and which represents the principle of constant action:

$$m_a t_a = m_b t_b \qquad (06)$$

The correctness of this fundamental equation has been proved by the gravitational energy in the two-mass system, which can be described by time dilation [3.].

Furthermore, various calculations were carried out with different two-mass systems: Both masses are at rest at a certain distance from each other and fall on each other. During the collision they have reached their final velocities and then experienced a calculable velocity-related mass increase and time dilation. The results are easy to check, because both energy and momentum conservation must always be fulfilled.

If the value t_a is assumed for space age, any mass m_b can be determined from its original mass m_a after a certain period of time $\Delta t = t_b - t_a$:

$$m_{\mathrm{b}} = \frac{m_a}{1+\Delta t/t_a} \qquad (07)$$

If, for example, the age doubles, the mass of space is halved in this time. The reduced structure of the mass is not lost, it serves the formation of time [4.]. The reduced mass does not lead to a contradiction in terms of energy conservation, since the gravitational field energy increases simultaneously. It becomes less negative with the mass reduction. The sum of mass energy and gravitational field energy is zero. Since there is no preferred place for space age, the universal mass reduction and gravitational field energy increase must occur without delay. The gravitational effect is therefore transmitted instantaneously. Today's assumption of light-fast transmission will probably prove to be wrong.

2. Mass and Time in Special Relativity Theory (SRT)

With the validity of equation (06) it can be shown that the special theory of relativity is wrong: For every object, time passes more slowly on it if its mass has been increased due to velocity. If the clocks of two objects in each inertial system are compared with each other, only the clock of the object can be slower compared to the second object, which was previously accelerated to a higher speed. This is independent of the point of view of the observer. Logic and equation (06) prohibit the view permitted in the SRT that each of the two clocks can follow the other.

At the following view, two objects should have same mass and should be located nearby each other.

Other objects should not be present in their area. The idle state is designated by index a and the state moved at constant speed by index b. For both masses applies according to (06):

$$m_{1a} t_{1a} = m_{1b} t_{1b} \qquad m_{2a} t_{2a} = m_{2b} t_{2b} \qquad (08)$$

A period of time that passes on the rest mass is greater than one on the moving mass. For example, if 10 minutes have passed on the rest mass, less than 10 minutes have passed on the same moving mass.

The second mass m_2 is accelerated to the velocity v and assigned to a second inertial system. For the moving mass m_{2b} and the then changed time span t_{2b} apply:

$$m_{2b} = \frac{m_{2a}}{\sqrt{1-\frac{v^2}{c^2}}} \qquad t_{2b} = t_{2a}\sqrt{1-\frac{v^2}{c^2}} \qquad (09)$$

Since both masses and their time flow are the same size in the rest state, m_{1a} and t_{1a} can easily be written instead of (09):

$$m_{2b} = \frac{m_{1a}}{\sqrt{1-\frac{v^2}{c^2}}} \qquad t_{2b} = t_{1a}\sqrt{1-\frac{v^2}{c^2}} \qquad (10)$$

According to the special theory of relativity, the positions of two observers on one object each should be interchangeable, so that each observer of one inertial system sees the time of the other passing more slowly.

According to this, from the point of view of the first observer, the time span t_{2b} on the second mass would be valid compared to his own time span t_{1a}:

$$t_{2b} = t_{1a}\sqrt{1-\frac{v^2}{c^2}} \quad (11)$$

From the point of view of the second observer, who according to the SRT could assume himself to be at rest, for the time span t_{1b} on the first mass, now assumed to be moving with v, would be valid in comparison to his own time span t_{2a}:

$$t_{1b} = t_{2a}\sqrt{1-\frac{v^2}{c^2}} \qquad ??? \quad (12)$$

The mass m_1, however, was not accelerated at all, is in a resting state and thus has not undergone any structural change. It must therefore be valid with $v_1 = 0$ according to (09):

$$t_{1b} = t_{1a}\sqrt{1-\frac{{v_1}^2}{c^2}} = t_{1a} \quad (13)$$

Since the following applies to the rest state of both masses: $t_{1a} = t_{2a}$, (13) is followed by the correct expression: $t_{1b} = t_{1a} = t_{2a}$ in contradiction to (12).

The mass m_1 was not moved, no energy was supplied to it. Therefore $m_{1b} = m_{1a}$ is valid here. If equation (06) is applied to the first object with the SRT, the result would be (12):

$$m_{1a}t_{1a} = m_{1b}t_{1b} = m_{1b}t_{2a}\sqrt{1-\frac{v^2}{c^2}} = m_{1a}t_{2a}\sqrt{1-\frac{v^2}{c^2}} \qquad ??? \quad (14)$$

If equation (06) is applied to the second object, equation (11) would apply:

$$m_{2a}t_{2a} = m_{2b}t_{2b} = \frac{m_{2a}}{\sqrt{1-\frac{v^2}{c^2}}}t_{1a}\sqrt{1-\frac{v^2}{c^2}} = m_{2a}t_{1a} \qquad ??? \quad (15)$$

However, the following relationships are correct for both objects:

For the first object that has not been moved, applies with the velocity $v = 0$:

$$m_{1a}t_{1a} = m_{1b}t_{1b} = \frac{m_{1a}}{\sqrt{1-\frac{0}{c^2}}}\, t_{1a}\sqrt{1-\frac{0}{c^2}} = m_{1a}t_{1a} \quad (16)$$

The following applies to the second object moving at speed v:

$$m_{2a}t_{2a} = m_{2b}t_{2b} = \frac{m_{2a}}{\sqrt{1-\frac{v^2}{c^2}}}\, t_{2a}\sqrt{1-\frac{v^2}{c^2}} = m_{2a}t_{2a} \quad (17)$$

While in equations (14) and (15) the parameters of both objects are mixed in an inadmissible way, equations (16) and (17) fulfil equation (06) which has been tested many times.

Conclusion: Assuming the validity of equation (06), the special theory of relativity proves to be wrong. Admittedly, a velocity-dependent mass and a velocity-dependent time flow are correct in principle. However, both quantities according to (06) are always valid in conjunction with each other for each object. For each object, the equation refers to its own state at rest or in motion.

3. Mass and Gravitational Field

A mass becomes larger with its speed. It experiences a contraction in length in the direction of movement. This also applies to 2 masses that attract and fall on each other from their respective rest positions and a certain distance.

With the speed, all atomic masses must also become larger and the electron distances to the nucleus smaller. Gravitational field energy is released during free fall, which is supplied to the masses and increases their velocity. This must also apply to masses and fields at absolute temperature zero. The field energy of space is also here transferred to the masses. One could think that in this case the field should have no energy.

Because no classical interaction particles, such as photons from the field, could be transferred to the masses. However, this only applies to the known interacting particles. Imaginary photons of the velocity c_i, however, are capable of this. They mediate an interaction between the magnetic monopoles that make up the neutrinos of the masses and that form the real and imaginary time when the neutrinos decay [4.]. The imaginary photons are the interaction particles of gravity, which must exert an instantaneous effect.

They unfold their effect over the imaginary time. An imaginary temperature $\mathcal{T}_i = \hbar/(kt_i)$ can also be assigned to this second time dimension t_i [5.]. With the imaginary speed of light c_i, one can also explain the positive mass equivalent m_{grav} of the gravitational field, as will be shown below.

It is known that positive masses attract each other. The gravitational field of masses is mainly located in their vicinity and is strongest at their surfaces. The field is attracted by the masses and not repelled. It therefore has a positive mass.

Since the gravitational field energy E_{grav} is negative, the simple relationship applies with its positive mass m_{grav}: $E_{grav} = m_{grav}{c_i}^2 = -m_{grav}c^2$.

In the two-mass system, the gravitational energy supplied to two masses with radii r_1 and r_2 when they collide from rest and at a certain distance r can be written: $E_{grav} = -\gamma\, m_1 m_2/r_b = -m_{grav}c^2$. Here $r_b = r(r_1 + r_2)/h$ with h as surface distance. The gravitational energy results from the integration of the gravitational force with the integration limits mentioned here [3.]

Conversely, two masses that are separated must become lighter and larger. The energy used during lifting does not benefit the masses but the gravitational field. It is charged. The energy of the gravitational field becomes less negative, i.e. larger. This must also apply to the absolute temperature zero point, the effect of gravity remains.

If the gravitational field is charged by the energy expended during lifting, the masses could in principle remain the same size. Why do they become smaller and the objects larger? Masses and their gravitational fields are inseparable. The sum of mass energy and gravitational energy is always zero. Both amounts of energy are equally large. If the gravitational energy becomes less negative, i.e. larger, the mass energy must in turn become less positive, i.e. smaller. Lifting transports the supplied energy into the gravitational field. Just as the masses determine the gravitational field energy, the gravitational field energy determines the masses.

If energy is used to accelerate a mass without lifting or dropping it relative to a second mass, this energy supply does not change the gravitational field energy of the mass. However, it changes the atomic structure of the mass, it becomes heavier with the speed. All moving electrons and protons of the mass atoms oppose the acceleration with their inertial resistance.

The difference between inertial and heavy mass is therefore the place where the energy is stored:

The inertial mass is stored in the object and the heavy mass is stored in the gravitational field, i.e. in space. The storage of space takes place via imaginary (virtual) photons of the velocity c_i in the imaginary second time dimensiont_i.

4. Mass Decay and Gravity

In the two-mass system, a further important relationship between mass decay and gravity can be derived from equation (06) [6.]:

$$\frac{\Delta m_{1\,mz}}{\Delta m_{2\,mz}} = \frac{\Delta m_{2\,grav}}{\Delta m_{1\,grav}} = \frac{m_1}{m_2} \qquad (18)$$

The ratio of the decay-related mass reduction of both masses corresponds to the inverse ratio of the speed-related mass increase due to gravity.

In other words, the product of mass increase due to gravity and mass reduction due to decay of one mass is always as large as the same product of the other mass.

5. Summary

Mass and time are inseparable. In mass decay, time results from a reduced mass structure. If the speed of a mass increases, a structure is formed in it when time is extinguished. The special theory of relativity is wrong. The gravitational field in space exists through the effect of an imaginary second time dimension. The mediator particles of gravity are imaginary (virtual) photons.

6. References

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[3.] See Source [2.], p.53

[4.] See Source [2.], p.35, p.74

[5.] See Source [2.], p.49

[6.] See Source [2.], p.54