

## **E=mc<sup>2</sup>: a self-evident non-physical equation**

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*Abstract – This article shows, from several points of view, why the equation E=mc<sup>2</sup> must be an untenable equation.*

### **Introduction**

The equation E=mc<sup>2</sup> is a result of the General Theory of Relativity, which is, on its turn, a result of the Special Theory of Relativity.

Mind-blowing, but above all shocking, from a scientific point of view, is the myth around this equation.

### **Kinetic energy considerations.**

The equation E=mc<sup>2</sup> suggests a kinetic energy, with the problem that it doesn't fit with the expression E=½mv<sup>2</sup>, replacing v by c. Because E=½mv<sup>2</sup> is a correct equation without any doubt, E=mc<sup>2</sup> can't be correct as well. Why isn't it possible that E=½mv<sup>2</sup>, with v=c? If there would be a reason for that, might it be then that v equals c-ε met ε arbitrarily small?

The mass in the equation under consideration is not just a normal mass, but, according to the GTR, a so-called relativistic mass, of which the value depends on its *constant* velocity v, mathematically written as:  $m = m_{\text{rest}} / \sqrt{1 - v^2/c^2}$ .

Based on the approximation:  $1/\sqrt{1-\varepsilon} \sim 1 + \varepsilon/2$ , m can also be written as:

$$m \sim m_{\text{rest}} \left( 1 + \frac{1}{2} \frac{v^2}{c^2} \right)$$

Both sides of this equation multiplied with c<sup>2</sup> results in:

$$mc^2 \sim m_{\text{rest}}c^2 + \frac{1}{2}m_{\text{rest}}v^2$$

Quoted from Wikipedia (a few years ago):

*The first term m<sub>rest</sub>c<sup>2</sup> is large, but stays unchanged in daily live, so we will hardly observe, except in case of, for example, nuclear power.*

The term m<sub>rest</sub>c<sup>2</sup> is called rest energy.

Mind alone the word, its contradiction in itself and the fact that m<sub>rest</sub> can only be in rest relative to an object that has the same velocity as m<sub>rest</sub>.

Later on in Wikipedia the “importance” of this equation has been accentuated by stating:

*Due to the enormous factor  $c^2$  in the formula, 1 gram mass corresponds with  $8,988 \times 10^{13}$  joule. This is the heating energy of 15 000 barrels crude oil, but also the energy of a bomb of 21.4 kiloton TNT: the same order of magnitude as the atomic bomb Little Boy that destroyed Hiroshima.*

Very impressive that, for example, a flint of say 10 gram does have a rest-energy equivalent to the heating energy of 150.000 barrels crude oil, which we hardly “observe in daily live”. An energy also equivalent to an atomic bomb with which 10 Hiroshima’s can be destroyed. A flint as Big Boy.

### **Relativistic mass considerations**

Firstly: a fundamental question regarding the “mass at rest” is: what is the chosen reference for determining a mass at rest? No mass is at rest at all in an absolute sense. It always has a velocity and is only in rest relative to an object with the same velocity.

Secondly: if a mass does have a velocity  $v_1$  relative to reference 1 and velocity  $v_2$  relative to reference 2, then it would have, at the same time, different relativistic masses, only depending on the reference that is taken to determine its velocity.

In as well the STR as the GTR such contradictions are “explained” by stating that the mentioned references have to be considered as observers, which *observe* these mutual different relativistic masses.

In these theories it has never been specified at all how such an *observation* is carried out. Besides that, this “explanation” contains two fundamental errors:

- In genuine physics theory and measurement are carefully distinguished. A theory describes what physically happens. In order to verify a theory, measurements have to be carried out. In STR and GTR these two things are mixed up: the theory includes already “measurements”.
- A mass of which its value would depend on its constant velocity contradicts with the Principle of Relativity, the postulate in physics that states that physical laws are the same in all inertial systems. As a result: certainly the value of a mass.

So, in genuine physics mass does have a certain constant value, independent of its velocity, and if two observers would observe mutual different values, at least one observer carried out a wrong measurement.

### **Conclusion:**

The equation  $E=mc^2$  is, considered from several points of view, a nonsense equation, leading to ridiculous conclusions about the amount of energy of masses “in rest”, added to the undefined reference regarding that “in rest”.

### REFERENCE

The Principle of Absolute Relativity

<http://gsjournal.net/Science-Journals/Research%20Papers/View/7311>