The Fallacy of E = mc^2 for Material Bodies

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Abstract

In this article, the author has studied the validity of the famous equation $E = mc^2$ for material bodies and found out that such validity is unproven.

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When an extremely small spherical charge moves steadily, as per Oliver Heaviside (1850-1925), a follower of James Clerk Maxwell (1831-1879), its electromagnetic momentum

$$\mathbf{p} = \gamma m_0 \mathbf{u} \quad (1)$$

where $m_0 = q^2/(6\pi\varepsilon_0 c^2 \delta R)$, $\gamma = 1/k$, $k = (1-u^2/c^2)^{1/2}$, q is the magnitude of charge, ε_0 = Permittivity of free space, δR = the radius of the charge, and $\mathbf{u}$ is the velocity of the charge in free space[1].

Eq. (1) implies that the electromagnetic mass of a very small charge increases by a γ factor with velocity,

Therefore, the kinetic energy of that charge, if the charge attains the velocity u from rest in free space,

$$K_{em}= \gamma m_0 c^2 - m_0 c^2 = mc^2 - m_0 c^2 \quad (2)$$

Eq. (2) implies that an electric charge is a form of energy.

We find that the electromagnetic momentum of a rotating charge in a cyclotron really follows Eq. (1). A charge repels a similar charge. Therefore, work has already been done to conglomerate a charge. Therefore, the charge is a store of energy. It is believed that there are experiments to show that when two dissimilar charges annihilate, energy as per Eq. (2) is generated. But a thorough experiment seems to be wanting.

According to the special relativity theory of Albert Einstein (1879-1955), the momentum of the material mass of a particle

$$\dot{p} = \gamma \, \dot{m}_0 \mathbf{u} \quad (3)$$

Therefore, the kinetic energy of the particle

$$K_m= \gamma \dot{m}_0 c^2 - \dot{m}_0 c^2 = \dot{m}c^2 - \dot{m}_0 c^2 \quad (4)$$

Where $\dot{m}_0$ is the Newtonian mass (material mass) of the particle at rest.

Eqs. (3) and (4) are on the same footing as that of Eqs. (1) and (2).

Therefore, here also we may say, following Albert Einstein, that the Newtonian mass/momentum of a particle increases by a γ factor with velocity, and Newtonian mass is a form of energy.

There is no experiment on Earth to show that the material mass/momentum of a material particle increases with velocity.

It is well proven that a material mass attracts a material mass. Therefore, to separate a material mass from a conglomerated mass, work is to be done. Therefore, a material mass cannot be a source of energy; it is a sink of energy.

However, relativists claim that they have experiments to prove Eq. (4).

An article published more than a decade ago[2] points out that Eq. (4) for material bodies has not been proven by experiments.

It is taught in the textbooks that the explosion of nuclear bombs proves Eq. (4).

The weight of the Hiroshima Bomb was 4400 kg. Incendiary bombs create fire and sound. This bomb created mainly gamma radiation.

As per Nuclear physics, this bomb should burn up to give ($4400 \times 2 \times 10^3$ kilocals) of energy ($E = mc^2$).

As per military records, (70×10^7) kilocals can destroy 1 sq. km.

Therefore, the Hiroshima bomb should destroy [($4400 \times 2 \times 10^3 / (70 \times 10^7$)] sq. km = 12.6×10^7 square km = 12.6×10

million sq. km = 12.6 × China-area or at least a part of it.

But the Hiroshima bomb destroyed only 4.4 sq. km of Hiroshima[3]!

In 1945, the USA dropped two powerful incendiary bombs with immense gamma radiation on Japan. The Hiroshima bomb produced a magnesium flash of greenish-white light with an ear-splitting roar [4]. The President of the USA declared that the USA had become the master of the force from which the sun drew its power. In a prewritten statement, he further declared that the bomb was two thousand times more powerful than the British "Grand Slam," which was the largest bomb ever yet used in the history of warfare, and called the bomb the "atomic bomb" or the "rain of ruin" [5][6][7]. The US army dropped (presumably millions of) leaflets on the cities of Japan, depicting the gamma radiation as proof of the atomic blast [8].

However, this blasting did not prove Eq. (4) valid for material bodies in any way.

Unfortunately, from the past century, science has been dictated by the sayings of some prophets, but not by experiments.

References

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