Rederivation and Investigation of $E=mc^2$ for higher energy Production

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Abstract— *$E=mc^2$ is derived from equation $E=Fd$, implying that photon behaves like a particle.*

Energy(E)=Force(F) into Displacement(d)

If a particle can reach higher speed, higher energy production is possible.

Keywords— energy, Einstein, velocity, particle.

I. INTRODUCTION

Photons have an interesting property is that they have momentum and yet have no mass. This was established in 1850 by James Clerk Maxwell Momentum is made up of 2 components, mass and velocity. Einstein's great insight was that the energy of a photon must be equivalent to a quantity of mass and hence could be related to the momentum.

In "Does the inertia of a body depend upon its energy-content?" Einstein used V to mean the speed of light in a vacuum and L to mean the energy lost by a body in the form of radiation. Consequently, the equation $E = mc^2$ was not originally written as a formula but as a sentence in German that meant if a body gives off the energy L in the form of radiation, its mass diminishes by L/V^2 .[1]

A remark placed above it informed that the equation was approximate because the conclusion was only justified if one neglected "magnitudes of fourth and higher orders" of a series expansion[2].

In 1960, Einstein's mass-energy relationship was written as $M_0 = E_0/c^2$ by Max Planck[3] and, subsequently, was given a quantum interpretation[4] by Johannes Stark, who assumed its validity and correctness (Gültigkeit).

However, Stark wrote the equation as $e_0=m_0 c^2$ which meant the energy bound in the mass of an electron at rest and still was not the present popular version of the equation.

In 1924, Louis de Broglie assumed the correctness of the relationship "énergie=masse c^2" on page 31 in his Research on the Theory of the Quanta (published in 1925) but he did not write $E = mc^2$. However, Einstein returned to the topic once again after the World War Two and this time he wrote $E = mc^2$ in the title of his article [5]intended as an explanation for a general reader by analogy[6].

Einstein derived existing $E=mc^2$ starting with result of relativistic variation of light energy but finally obtained $E=mc^2$ by applying classical conditions.

After Einstein, Max Planck also derived the same independently. In 1907 Planck made an in depth investigation of the energy confined within a body. The inertia of mass of body is altered by absorption or emission of heat energy. The increments of mass of body are equal to heat energy divided by square to speed of light.

Although Einstein started to derive $E=mc^2$ using relativistic variation of light energy yet he derived final results under classical condition. Einstein interpreted the results using Binomial Theorem which is applicable if v far less than c.

Isaac Newton,S. Tolver Preston Poincare De Pretto and F. Hasenohrt are the philosophers and physicists who have given idea of $E=mc^2$.

II. HYPOTHESIS

$E=mc^2$ can also be derived from $E=F.d$

Energy(E)=Force(F) into Displacement(d)

Force=Mass(m) into acceleration(a)

Acceleration=Rate of change of velocity(v), (assuming uniform acceleration)

Note:

*If particle can reach higher velocity, higher energy production is possible.

*Photon is a particle; however it behaves like a wave.

III. DISCUSSION

E=F.d

F=m.a

E=m.a.d

$a=v_2-v_1/t$

t=time required to change velocity

This is also the time required for displacement.

Now

$E=m.v_2-v_1/t$ .d

Velocity=displacement over time

v=d/t

Assuming a particle was static

$v_1=o$

So

$E=m.v_2/t$ d

$E=m.v_2$ .d/t

$E=m.d_2/t$ .d/t

d_2 is same as d as the velocity of particle becomes so fast that within a second the particle reaches d_1 from d.

So $E=m.d_2/t$ .d/t

$d_2=d$

So I shall name it only d

E=m.d/t .d/t

E=m.v.v

As (d/t=v)

What is highest possible velocity?

Till today =c=velocity of light=speed of light

E=m.c.c

E=mass into square of speed of light

$E=mc^2$

*There is a possibility of production of higher energy from same matter if speed of matter can exceed light. As our knowledge expands, higher than speed of light may be found. But this method of establishing $E=mc^2$, proposes that photon is a particle.

IV. CONCLUSION

$E=mc^2$ can also be derived from E=F.d

*If particle can reach higher velocity .higher energy production is possible.

*Photon is a particle; however it behaves like a wave**.**

DECLARATION FROM AUTHORS

I declare that the article I have sent to the journal is original & has not been published in any other journal. I transfer the right to publish in this journal, if accepted for publication.

REFERENCES

[1] See the sentence on the last page (p.641) of the original edition of Ist die Trägheit eines Körpers von seinem Energieinhalt abhängig? in Annalen der Physik, 1905, below the equation K0 - K1= L/V2 v2/2. See also the sentence under the last equation in the English translation, K0 - K1= 1/2 L/c2 v2, and the comment on the symbols used in About this editionthat follows the translation [1]

[2] See the sentence on the last page (p.641) of the original edition of Ist die Trägheit eines Körpers von seinem Energieinhalt abhängig? in Annalen der Physik, 1905, above the equation K0 - K1= L/V2 v2/2. See also the sentence above the last equation in the English translation, K0 - K1= 1/2 L/c2 v2, and the comment on the symbols used in About this editionthat follows the translation [2]

[3] Planck, M. (1907). Ber.d.Berl.Akad. 29: 542.

[4] Stark, J. (1907). "Elementarquantum der Energie, Modell der negativen und der positiven Elekrizitat". Physikalische Zeitschrift 24 (8): 881.

[5] A.Einstein 'E = mc2 ': the most urgent problem of our time Science illustrated, vol. 1 no. 1, April issue, pp. 16-17, 1946 (item 417 in the "Bibliography"

[6] M.C.Shields Bibliography of the Writings of Albert Einstein to May 1951 in Albert Einstein: Philosopher-Scientist by Paul Arthur Schilpp (Editor) Albert Einstein Philospher - Scientist.