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AJAY SHARMA RE-JUSTIFIES HIS PAPER ON GENERLAIZATION OF $E = mc^2$, POINTING OUT ELEMENTARY MISTAKES IN ANDREW GEORGE'S PAPER

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Abstract

To draw scientific conclusions, the knowledge of the paper/topic and basic aspects of science is necessary. But it has not been so in Prof Andrew George's comments regarding Ajay Sharma's work on Einstein's Sep. 1905 paper . Ajay Sharma has confirmed in various publications that Einstein's Sep. 1905 derivation contradicts law of conservation of matter under some conditions. This aspect is justified here.

1 Theme of discussion

1. This discussion deals with original derivation of $E = mc^2$ i.e.

$$\text{Energy emitted} = (\text{Mass annihilated}).c^2 \tag{1}$$

Einstein [1] initially derived $L = mc^2$ (Light Energy Mass equation) in Sep.1905 paper and speculated $E = mc^2$ from it. The final equations in Einstein's derivation [1] can be quoted as

$$K_0 - K_1 = \frac{Lv^2}{2c^2} \tag{2}$$

where K_0 is KE of body before emission of Light Energy, K_1 is KE after emission of light energy L . Einstein further interpreted eq.(2) as

$$\begin{aligned} \frac{M_b v^2}{2} - \frac{M_a v^2}{2} &= \frac{Lv^2}{2c^2} \\ M_a &= M_b - \frac{L}{c^2} \end{aligned} \tag{3}$$

Or

"*Mass of the body after emission of light energy = Mass of the body before emission of light energy* - $\frac{L}{c^2}$"

It implies that when a body emits light energy its mass decreases by factor $\frac{L}{c^2}$. Einstein has obtained eq.(3) under special conditions with handpicked values of various parameters. Ajay Sharma [2-9] has published papers/articles in International Journals and Conferences after peer review. The same aspect is illustrated in book [9] *Einstein's $E = mc^2$ Generalized with details.*

The striking point of Ajay Sharma's work is that Einstein's derivation of $L = mc^2$ as given in Sep.1905 paper is true under VERY SPECIAL CONDITIONS. Further from $L = mc^2$ Einstein speculated or postulated $E = mc^2$, as no derivation or mathematical treatment has been given [1].

2. Here is also other side of the picture. Under general conditions Einstein's Sep. 1905 derivation of $L = mc^2$ (from which $E = mc^2$ is speculated) CONTRADICTS the LAW OF CONSERVATION OF MATTER. This derivation (Einstein's Sep.1905 derivation) predicts (under some conditions) that '*When body emits light energy its mass must increase*'.

   Under some conditions [2-9] eq.(3) also reads as

   "*Mass of body after emission of light energy = Mass of body before emission of light energy + positive quantity*"

   Thus when body emits Light Energy its mass increases. It is not correct prediction from Einstein's Sep. 1905 paper.

2 The series of misperceptions of Prof. Andrew George about Einstein's Sep. 1905 derivation and about Ajay Sharma's publications.

Prof. Andrew George [10] has quoted or re-written eq.(4) from Ajay Sharma's work published in international journal Physics Essays [2] as

$$K_1 - K_0 = -\frac{Lv^2}{2c^2} + L\beta\gamma\cos\Psi \tag{4}$$

where $\gamma = \frac{1}{\sqrt{1-\frac{v^2}{c^2}}}$, $\beta = \frac{v}{c}$ and Ψ is the angle at which light energy is emitted. Ajay Sharma has justified [2] both mathematically and conceptually, how this equation leads to inconsistent results i.e.

When body EMITS *light energy its mass must* INCREASE.

But Dr Andrew George has called this conclusion incorrect, which is based upon his following personal scientific limitations or lack of knowledge of Einstein's Sep 1905 paper, Ajay Sharma interpretation and basic aspects of science (especially principle of dimensional homogeneity).

1. It is taught in high school that in science conclusions are drawn from final equation taking all factors in account. Dr Andrew George [10] has deviated from this rule and without ANY SCIENTIFIC LOGIC has drawn conclusions from middle of derivation from an equation. In case Prof. George has solved eq.(4) further, he would have supported Ajay Sharma's claim.

2. Each term in eq.(4) has dimensions of energy. In RHS of eq.(4) he has arbitrarily interpreted one term as 'energy' $[ML^2T-2]$ and other as 'mass'$[ML^0T^0]$; the LHS of the same equation is Kinetic energy. In his paper [2] Ajay Sharma has converted the equation in terms of mass for final conclusions. It is again discussed in next sub-section. But Prof. George has not tried to read the same, which would have removed all his misperceptions. In the paper [2] , the same conclusion is drawn over half dozen times , about which Prof. Andrew George is completely silent.

3. Prof. Andrew George has illogically concluded that eq.(4) implies

   "*When body emits Light Energy, the mass of body decreases by* $\frac{L}{c^2}$".

   It clearly states he does not have any idea of Einstein's Sep. 1905 derivation or he is contradicting the same also. It can be easily illustrated how Einstein arrived at above conclusion. We have

$$\begin{aligned} K_0 - K_1 &= \frac{Lv^2}{2c^2} \\ \frac{M_b v^2}{2} - \frac{Mav^2}{2} &= \frac{Lv^2}{2c^2} \\ Ma &= Mb - \frac{L}{c^2} \end{aligned} \tag{5}$$

   Or

   "*Mass of body after emission of light energy = Mass of body before emission of light energy -* $\frac{L}{c^2}$"

   Hence everything is transparent, eq.(2) and eq.(4) can never give same deductions for as angle Ψ has numerous values. So much so Ajay Sharma [2] has carefully justified the same in his publications. But Dr Andrew George[10] did not take all aspects in account and jumped to incorrect and unscientific conclusions. Own limitations cannot make one wise.

3 The correct approach, as published in various peer review publications.

Prof. George Andrew has justified Sharma's work completely, but did not solve the equation. In his paper Ajay Sharma [2] has solved equation further for $\Psi = 89^o$, $\cos 89^o = 0.01745$. Thus eq.(4) becomes

$$\begin{aligned} \frac{M_a v^2}{2} - \frac{M_b v^2}{2} &= -\frac{L v^2}{2c^2} + 0.01745 L\gamma \frac{v}{c} \\ M_a - Mb &= -\frac{L}{c^2} + 0.03490 \frac{L\gamma}{cv} \end{aligned} \tag{6}$$

Einstein has derived equation under classical conditions i.e. $v = 10\frac{m}{s}$, hence $M_a - M_b = -\frac{L}{c^2} + 0.04\frac{L}{10c}$ Thus Mass after emission (M_a) = Mass before emission $(M_b) + (0.04\frac{L}{10c} - \frac{L}{c^2})$ (1)

Here $(0.04\frac{L}{10c} - \frac{L}{c^2})$ is positive quantity and each term has dimensions of mass $[ML^0T^0]$;. Hence

'When light energy is emitted, mass of body must also increases'

It is not correct prediction from Einstein's Sep. 1905 derivation under general conditions. Thus Prof. Andrew should have drawn conclusions from the final equation that too with scientific logic. If properly interpreted Prof. Andrew George's work supports Sharma's work that Einstein's Sep 1905 derivation is true under special conditions only, not in general.

Remark: In published articles or proposed articles Professor Andrew George claims that he is Faculty Member at Department of Physics, University of Denver, CO 80208 USA, but Chairman of the Dept. has clarified that Andrew George is not and never has been faculty member at Dept of Physics. The sort of arguments lacking understanding of basic physics has been raised by Prof. Andrew George numerous time at various websites ans have been replied as here now.

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