

**Which mathematical equation from Einstein's Sep. 1905 derivation predicts that when Light Energy is emitted, MASS OF BODY INCREASES ?**

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Einstein's 27 Sep 1905 paper Link [http://www.fourmilab.ch/etexts/einstein/E\\_mc2/www/](http://www.fourmilab.ch/etexts/einstein/E_mc2/www/)

**Abstract**

Einstein has speculated  $E = \Delta m c^2$  from  $L = \Delta m c^2$  in his Sep 1905 paper. This derivation ( under SPECIAL CONDITIONS) predicts that when Light Energy is emitted mass of body decreases. It is true. But the same derivation under general conditions ALSO predicts that when body emits light energy its mass must increase. It is inconsistent prediction from Einstein's derivation and contradiction of Law of Conservation of Matter or Energy. Einstein did not discuss this aspect in his work. This aspect is highlighted here.

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**1. What is Einstein's Sep 1905 paper in few words?.**

**AJAY SHARMA** : In this paper Einstein derived a relationship between Light energy emitted (L) and corresponding decrease in mass ( $\Delta m = M_b - M_a$ ) as

$$L = (M_b - M_a)c^2 \quad \text{or} \quad M_b - M_a = L/c^2$$

From here Einstein speculated  $E = mc^2$

Practically, Einstein considered a body at rest emitting light energy. Einstein measured the magnitude of light energy in a moving system. And then he derived a relation between ENERGY EMITTED (L) and DECREASE IN MASS ( $\Delta m$ ) of body.

**2. Under which conditions Einstein derived this equation  $L = \Delta m c^2$  ?**

**AJAY SHARMA:** In Einstein's derivation , there are four variables i.e.

- Number of light waves emitted by body
- Magnitude of energy of light waves
- Angles at which waves are emitted by body
- Velocity of measuring system w.r.t. body emitting light energy.

Einstein took SPECIAL CONDITIONS to derive  $L = mc^2$  and speculated from it  $E = mc^2$

- Einstein took , Just two light waves
- Energy of light wave is equal

- (c) Waves are emitted in opposite directions
- (d) Velocity measuring system w.r.t body is in classical region.

Thus under these conditions Einstein's derivation is OK. The result is **When body emits light energy, its mass decreases** i.e.  $L = (M_b - M_a)c^2$   
It is correct.

### 3. What about Law of Conservation of momentum?

**AJAY SHARMA** : After emission of light energy body

- (i) May remain at rest.
- (ii) May tend to move
- (iii) May move apparently or visibly

the law of conservation of momentum is always obeyed. The velocity of recoil can be calculated by applying equation,

Initial Momentum = Final Momentum

The velocity of recoil of gun is determined by this method.

Einstein has considered first case ONLY.

### 4. Which is the mathematical equation obtained by Einstein in Sep 1905 paper which predict that When light energy is emitted, mass decreases?

**AJAY SHARMA**: The final equation in this regard is

$$\Delta m = L/c^2$$

or  $M_a$  ( mass of body after emission) =  $M_b$  ( mass of body before emission) –  $L/c^2$

Thus mass of body decreases when light energy is emitted.

Einstein has derived this equation under SPECIAL CONDITIONS by considering two light waves of equal energy( 0.5L each ) , emitted in opposite directions etc.

### 5. Which is mathematical equation which follows from Einstein's derivation and implies that when Light Energy is Emitted mass of body Increases?

**AJAY SHARMA** There are numerous equations to this fact which follows from Einstein's Sep 1905 derivation and predict that when

Light Energy is emitted, Mass of Body Increases.

It is contradiction of LAW OF CONSERVATION OF MATTER OR ENERGY.

One case is e.g. when body emits TWO LIGHT WAVES of energies 0.501L and 0.499L , emitted in OPPOSITE DIRECTIONS. Thus all conditions are same as that in Einstein's derivation except magnitude of Light energy (Einstein has taken energy equal to 0.5L each).

Exactly repeating the calculation as done by Einstein in Sep 1905 paper we get

$$\Delta m = \text{Mass of body before emission } (M_b) - \text{Mass of body after emission } (M_a)$$

$$= -0.004L/cv + L/c^2 \quad (16)$$

$$\text{or } M_a = 0.004L/cv - L/c^2 + M_b$$

Thus

Mass of body after emission of light energy ( $M_a$ )

= Positive Quantity + Mass of body before emission.

Hence mass Increases, when light energy is emitted.

It is not CORRECT prediction FROM Einstein's derivation.

## Part II

If somebody disagree then one can write to Editor Physics Essays addressing the following issues.

**What is Einstein's Sep 1905 paper?**  
**What are conditions under which it is derived?**  
**What is Planck's observation regarding it?**  
**Under what conditions experimentally it holds good?**  
**Why Einstein did not generalize the same?**  
**How to generalize it under all conditions?**  
**What is Ajay Sharma's Interpretation?**  
**How Ajay Sharma's paper is different from Einstein's Sep 1905 paper.**  
**How Editors/referees who have published it are WRONG?**  
**How Ajay Sharma's interpretation is incorrect (if it)?**  
**What are the correct interpretations AND EQUATIONS?**  
**My paper answers all above questions.**  
**It follows from Einstein's derivation under legitimate conditions,(in some cases) that when Light Energy is Emitted , mass of body INCREASES.**  
**It is incorrect deduction from Einstein's derivation.**

## Part IV

### References.

#### References of Einstein's work

A. Einstein, *Annalen der Physik* **18** (1905) 639-641.  
DOES THE INERTIA OF A BODY DEPEND  
UPON ITS ENERGY-CONTENT?  
Weblink is  
Einstein's 27 Sep 1905 paper available at  
[http://www.fourmilab.ch/etexts/einstein/E\\_mc2/www/](http://www.fourmilab.ch/etexts/einstein/E_mc2/www/)

## PartII

#### References of Ajay Sharma's work

My work is available at  
A. Sharma, *Physics Essays*, **17** (2004) 195-222.  
"**The Origin of Generalized Mass-Energy Equation  $\Delta E = Ac^2 \Delta M$ ; and its applications in General physics and Cosmology**".  
[http://www.burningbrain.org/pdf/ajaysharma\\_einstein.pdf](http://www.burningbrain.org/pdf/ajaysharma_einstein.pdf)

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#### International Conferences

It has been accepted for presentation over 55 conferences all over the world  
-----few of them

1. Sharma, A. presented in 19th International Conference on the Applications of Accelerators in Research and Industry , 20-25

August , 2006 Fort Worth Texas, **USA**

2. A. Sharma, Abstract Book 38th European Group of Atomic Systems ( **Euro physics Conference**) Isachia (Naples) **Italy** (2006) 53.
3. A. Sharma , Abstract Book , A Century After Einstein Physics 2005 , 10-14 April 2005 ( Organizer Institute of Physics , Bristol ) University of Warwick , **ENGLAND**
4. A. Sharma presented in 5th British gravity Conference , **OXFORD ENGLAND**
5. A. Sharma,. Proc. Int. Conf. on Computational Methods in Sciences and Engineering 2003 World Scientific Co. **USA** , (2003) 585.
6. A. Sharma, Proc. Int. Conf. on Number, Time, Relativity United Physical Society of Russian Federation, **Moscow** , (2004) 81 plus more

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**Journals**

This paper  
”**The Origin of Generalized Mass-Energy Equation  $\Delta E = Ac^2 \Delta M$ ; and its applications in General physics and Cosmology**”.  
is published in journal  
Physics Essays , **CANADA**  
[www.physicsessays.com](http://www.physicsessays.com)  
The paper  
The past ,present and future of  $E=mc^2$   
will be published in 2007 Galilean Electrodynamics, Massachusetts,  
**USA**.  
In parts it is published in various others journals.

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**Book 100 Years of  $E=mc^2$**

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