

# THE ORIGIN OF GENERALISED MASS-ENERGY EQUATION $\Delta E = Ac^2 \Delta M$ ; AND ITS APPLICATIONS IN GENERAL PHYSICS AND COSMOLOGY

Ajay Sharma

*Community Science Centre, DOE, Post Box 107, Shimla, 171001 HP, INDIA  
Email [physicsajay@lycos.co.uk](mailto:physicsajay@lycos.co.uk), [physicsajay@yahoo.com](mailto:physicsajay@yahoo.com)*

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/)

Einstein's (Sep. 1905) derivation theorizes that when light energy ( $L$ ) is emanated by luminous body then its mass diminishes as  $\Delta m = L/c^2$  and this equation is speculative origin (without proof) of  $\Delta E = c^2 \Delta m$ . The same derivation predicts that mass of luminous body inherently INCREASES ( $\Delta m = -0.03490 L/cv + L/c^2$ ) when it emits light energy in some cases, mass of body also remains same ( $\Delta m = 0$ ). Alternate equation  $\Delta E = Ac^2 \Delta M$  has been suggested, which implies that energy emitted on annihilation of mass (or vice versa) can be equal, less and more than predicted by  $\Delta E = c^2 \Delta m$ . The total kinetic energy of fission fragments of  $U^{235}$  or  $Pu^{239}$  is found experimentally 20-60 MeV less than Q-value predicted by  $\Delta mc^2$ , it is explainable with  $\Delta E = Ac^2 \Delta M$  with value of  $A$  less than one.  $\Delta E = c^2 \Delta m$  is yet unconfirmed in chemical reactions. Energy emitted by Gamma Ray Bursts (most energetic event after Big Bang) in duration 0.1-100s, is  $10^{45}$ J which can not be explained by  $\Delta E = \Delta mc^2$ , similar is the case of Quasars. It can be explained with high value of  $A$  i.e.  $2.57 \times 10^{18}$ . The mass of particle Ds (2317) discovered at SLAC, have mass lower than current estimates; it can be explained with value of  $A$  more than one.  $\Delta E = Ac^2 \Delta M$ , explains that mass of universe  $10^{55}$ kg was created from dwindling amount of energy ( $10^{-444}$ J or less) and  $A$  is  $2.568 \times 10^{-471}$  J or less; and in the end may reduce to small energy. It gives explanation for big bang, annihilation of antimatter in hadron epoch, black holes and for dark matter etc. For origin of inherent gravitational energy it implies that it is another form of mass like other energies, hence gravitation and mass are inseparable.