# Reports on 041509A:

**

**The First Report**:

**A)** In this paper Author in section **1.0** starts with an analysis of the Einstein's general definition of the kinetic energy, indicating that this is valid only when the direction of the force and that of the displacement are co-linear or coincide. Author, referring to the equation (dK = dW = **F.dx** = Fdx cosθ) appeared as (1) in his paper 041509A, specifically says: "Thus Einstein [8] in the derivation specifically assumed that value of θ equal to 0º (cos0º = 1).". Given that this is the main argument of this paper, let's try to demonstrate that author is wrong in this statement, through the following general development:

Although Einstein in the section 10 (§ 10. Dynamics of the Slowly Accelerated Electron) of his paper indicated by author as ref. [8], was not very persuasive, and not very rigorous (in fact, he erroneously obtains $m = \dfrac{M_0}{1 - \dfrac{v^2}{c^2}}$ as the transversal mass definition), nowadays, it is accepted as the Einstein's corrected (by Planck in 1907) transversal mass definition the following expression: $m = \dfrac{M_0}{\sqrt{1 - \dfrac{v^2}{c^2}}}$, or relativistic Einstein's mass definition. If author of this paper accepts Einstein's mass definition as a correct one, then he is obliged to accept that the value $E = mc^2$ **is exactly and correctly obtained for all cases**. Although Einstein, as said, does not show convincingly this fact, it modernly is completely shown general and known. In fact, from the general force (vector) $\mathbf{F}$ definition:

$$\mathbf{F} = \frac{d\mathbf{p}}{dt} = \frac{d(m.\mathbf{v})}{dt} \qquad (1)$$

And from the differential of Kinetic Energy $dK$ (scalar) defined as the work done by $\mathbf{F}$ to make a mass $m$ (scalar) have a differential displacement $d\mathbf{s}$ (vector). And taking from the general vector calculus the following known relationship: $d(\mathbf{A} \bullet \mathbf{A}) = 2\mathbf{A} \bullet d\mathbf{A} = d(A^2) = 2A.dA \Rightarrow \underline{\underline{\mathbf{A} \bullet d\mathbf{A} \equiv A.dA}}$, for $\mathbf{A} = m.\mathbf{v}$, it follows, the following general vectorial development:

$$dK = \mathbf{F} \bullet d\mathbf{s} = \frac{d(m.\mathbf{v})}{dt} \bullet d\mathbf{s} = d(m.\mathbf{v}) \bullet \frac{d\mathbf{s}}{dt} = d(m.\mathbf{v}) \bullet \mathbf{v} = \frac{1}{m} d(m.\mathbf{v}) \bullet (m.\mathbf{v}) = d(m.v).(v)$$

So, the following equation of differential kinetic energy is **a general definition in physics, valid in any case:**

$$dK = v^2.dm + m.v.dv \qquad (2)$$

Having (2) and taking derivatives of Einstein's mass definition, we obtain:

$$m = \frac{M_0}{\sqrt{1-\frac{v^2}{c^2}}} \quad \Rightarrow \quad dm = \frac{M_0.c.v.dv}{\left(c^2-v^2\right)^{\frac{3}{2}}} = \frac{M_0}{\left(1-\frac{v^2}{c^2}\right)^{\frac{1}{2}}}.\frac{v.dv}{\left(c^2-v^2\right)} = \frac{m.v.dv}{\left(c^2-v^2\right)} \qquad (3)$$

Operating on (3), using (2) and simplifying:

$$\frac{dm}{m} = \frac{v.dv}{\left(c^2-v^2\right)} \quad \Rightarrow \quad c^2.dm = v^2.dm + m.v.dv \quad \Rightarrow \quad c^2.dm = dK \qquad (4)$$

From equations (2) and (4), and integrating from rest mass, $M_0$, where kinetic energy is null (body at rest, $v = 0$), to a new generic state of accelerated mass $m$, where kinetic energy is $K$ (body at a generic speed $v$), Einstein's Kinetic energy expression is readily obtained:

$$\Delta K\Big|_0^K = K = \int (m.v.dv + v^2.dm) = \int_{M_0}^{m} c^2.dm \quad \Rightarrow K = \Delta m.c^2 \text{ for } \Delta m = m - M_0$$

$$K = m.c^2 - M_0.c^2 \qquad (5)$$

Total Energy is the addition of kinetic energy plus internal energy. By defining the internal energy as $E_{\text{int}} = M_0.c^2$, is obtained the celebrated formula $E_{Total} = K + E_{\text{int}} \Rightarrow E_{Total} = m.c^2$, or for short $E = mc^2$, valid in Einstein's jerk for any mass and for any speed $v$, explicitly observable in the Einstein's definition of mass, $m = \frac{M_0}{\sqrt{1-\frac{v^2}{c^2}}}$.

As it is observed and has been shown, $E = mc^2$ does not have any restriction. Thus, the main statement done by author is wrong.

**B)** "**2.0 Conditions of derivation of K = W = $\mathbf{M_{motion}\, c^2 - M_{rest}\, c^2}$**" refers to the same consideration done in (A). So, author in this section is also wrong.

C) All the following presented sections in the paper are related more or less with the consideration done in (A). So, the same conclusion is arrived at.

My recommendation is the rejection of this paper for publication in the JVR.

Note: In author's work, from equation (12), $E_T = KE + M_{rest}.c^2$, is straightforward to realize that when the speed of mass $m$ is null ($v = 0$), say it is at rest, the total energy $E_T$, consolidates the basis for the definition of the energy at rest, $E_{rest}$, due that the kinetic energy is null, $KE = 0$. Thus, in this case $E_T = E_{rest}$ and equals the quantity $M_{rest}.c^2$. In this way, it is identified and checked the value of the Einstein's definition of energy at rest, $E_{rest} = M_{rest}.c^2$. Although based in Einstein's mass definition author develops the Einstein's energy equation concluding erroneously that it is not general (valid only when a body moves in the direction of force), additionally, author presents a semantic discussion for arriving at the same Einstein's energy-at-rest definition which does not aggregate new results or theoretical value to justify the publication of this paper. These reasons ratify the recommendation of rejecting this work.

**

**The Second Report**:

**

**The Third Report:**