

## Further Comments on Khan's so-called 'Equation of Trickery'.

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### **Abstract.**

The full derivation of another crucial equation in Einstein's 1905 article, *On the Electrodynamics of Moving Bodies*, is presented to aid clarification and to further correct a misapprehension that some trickery is employed by Einstein at this particular point in his paper.

On reading my book 'Exploding the Myth'[1], it will be seen that I am skeptical to some extent of both special and general relativity. I don't say they are wrong but do question their almost pre-eminent place in modern physics because, almost always, the results may be derived by alternative methods. Again, I believe I was one of the first people to modify the traditional derivation of Maxwell's electromagnetic equations to cover the more general case of a moving medium [2]. Indeed, if Maxwell himself had done this, one wonders if relativity would ever have arisen given that the modified equations are invariant under Galilean transformation. In general relativity, virtually all the results have been derived without using relativistic ideas by my friend Bernard Lavenda [3]. In any case, the accepted result for the shift of the perihelion of Mercury was derived by Gerber in 1898 [4] but not recognised for some unexplained reason.

In my view, therefore, it is undoubtedly valid for people to question many of the results of both special and general relativity. As mentioned already, in general relativity, many of the results may be achieved by using methods unrelated to general relativity itself. This does not make general relativity wrong but, rather, shows that it doesn't hold a unique place in deriving results such as the expression for the shift of the perihelion of Mercury. However, many of the results associated with relativity have been shown to be valid and so one must be very careful when criticizing accepted results. Relativity theory is essentially mathematical in nature and, therefore, when criticizing this mathematics, it is vital that no mathematical mistakes appear in that criticism. This is manifestly not so in the case of at least some of the manipulations in the article 'Experimental and Theoretical Evidences of Fallacy of Space-time Concept and Actual State of Existence of the Physical Universe'[5].

The prime example here must be the so-called 'equation of trickery', although in Khan's article it is not absolutely clear to which equation, or equations, this term refers. The two equations in question appeared in one of Einstein's 1905 papers – specifically *On the Electrodynamics of Moving Bodies*. Here the first, and more basic, of these equations is derived correctly precisely as Einstein indicated: after a time  $t$  has elapsed, the  $x$ -coordinates in the two frames are related by

$$x' = x - vt$$

where the dashed coordinates refer to the moving frame of reference.

Hence,

$$x = x' + vt$$

and so, if a light ray takes time  $t$  to travel from the origin of the stationary frame to the point  $x$  then the speed taken is given by

$$x/t \text{ or } (x' + vt)/t$$

and, if the speed of light is constant and given by  $c$ , both of these expressions must equal  $c$ . It follows immediately from putting the second expression equal to  $c$  that

$$t = x'/(c - v)$$

If the ray is moving in the opposite direction, the time taken is given by

$$t = x'/(c + v)$$

Hence, when you enter the various arguments for the  $\tau$  into the equation

$$(\tau_0 + \tau_2)/2 = \tau_1,$$

one arrives precisely at Einstein's equation. As has been shown already by Dunning-Davies [6] the further manipulation leading to the differential equation

$$\frac{1}{2} \left( \frac{1}{c-v} + \frac{1}{c+v} \right) \frac{\partial \tau}{\partial t} = \frac{\partial \tau}{\partial x} + \frac{1}{c-v} \frac{\partial \tau}{\partial t'}$$

is also absolutely correct, although Einstein doesn't include the actual manipulation in his article.

Hence, the stated basis for the article, 'Experimental and Theoretical Evidences of Fallacy of Space-time Concept and Actual State of Existence of the Physical Universe', is seen to be incorrect and this has to raise serious questions concerning the remainder.

Some other points might be noted also. Energy/mass equivalence has been found valid experimentally on occasions too numerous to mention. Also, it might be noted that, although this result is usually attributed to Einstein, it dates from the previous century and the idea of mass/energy equivalence originated in electromagnetic theory as may be seen from, for example, J.J.Thomson's book *Electricity and Matter*. Again, the problems of the Michelson-Morley experiment have been investigated in minute detail, particularly in more recent years by R. Cahill, whose work is readily available for scrutiny via the internet.

#### References.

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- [6] Dunning-Davies, J., <http://vixra.org/abs/1202.0018> (Relativity and Cosmology)
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