Smulsky, J.J. 1994. "Force Cannot Depend on Acceleration", Apeiron, No. 20, p. 43 - 44.

received synchronously, the event of the raising of the flag can only occur at the point M'

The conclusion that M' is a unique position in space at which simultaneity of received signals will occur seems logically inescapable, If the observer is at the position M' at time AM/c, he must record simultaneity, and if not he will record a time-lapse between two signals whether the train is in motion relative to the embankment or not If the train is in motion with velocity v, the distance of the observer from M' must be such at any time prior to the moment of simultaneity at M', that his velocity will carry him to M' at the required instant, *i e* if T is the time of the flash event, and T' the time of the arrival event at M', his distance from M' must comply with v(T'–T) The inversion of relative motion shown in Fig 1b does not alter this outcome The velocity of the train is then divorced from any involvement with c The determination of simultaneity is thus only a matter of the establishment of a spatial position at a specific time The clock paradox now disappears, as does the ROS, whilst the PIVL holds, It does not seem unreasonable to adopt this stance, although certain observed phenomena, *e g* the prolonged time before decay of very high velocity muons, seem discordant

Whilst the observer can detect his relative motion by the presence of a Doppler shift from expansion or compression of the received photon wave-packets, he has of course no means of detecting whether he is in motion or stationary

What is perhaps more important is the imponderable question, beyond that of the PIVL issue, of what the physical conditions are which limit the speed of light *in vacuo* to its known finite value?

Finally, as a practical photometric observer of eclipsing binary stars, spending many cold hours measuring their orbital periods as one eclipses the other, I am considerably disconcerted to read the authors' statement that "there is no reason to believe that stellar binaries are genuine double stars", and would welcome clarification!

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Force Cannot Depend on Acceleration

My article (Smulsky 1992) about the force of interaction between two charges has raised some interest Prof Andre K T Assis has kindly sent me a few papers on this question He is a supporter of Weber's force, which depends on acceleration of the particle In his papers, which show extensive knowledge of the historical background Assis has studied different properties of Weber's force For example, in one paper (Assis and Caluzi 1991) he showed that according to Weber's law, the charge in a flat capacitor could attain velocities larger than light velocity But this contradicts experiment I agree with Assis's result In another paper (Assis 1992) Assis refutes Richard A. Waldron's proof showing that the force cannot depend on acceleration I think that in this case Assis is not right His mistake is due to R A. Waldron's mistaken derivation Therefore, I shall repeat R A. Waldron's derivation and remove the error

If the force depends on acceleration $F = F(r, v, a)$, then at small acceleration a the force a can be given in the form of a Taylor series expansion

$$F = f_o + f_1 a + f_2 a^2 + \qquad (1)$$

Where $f_i = f_i(r, v)$, $i = 0, 1, 2$,

If the force given by (l) acts on a body with mass m, it will receive the acceleration

$$a = F/m, \qquad (2)$$

If the force is multiplied by a factor n $F_1 = nF$, then according to Newton's second law (2) the acceleration will be

$$a_1 = F_1/m = nF/m = na \qquad (3)$$

The expression (1) is general and it is valid for force F_1

$$F_1 = f_o + f_1 a_1 + f_2 a_1^2 + \qquad (4)$$

If we substitute F_1 and a_1 in Eq (4), we obtain $Fn = f_o + f_1 na + f_2 n^2 a^2 +$ Then

$$F = f_o/n + f_1 a + f_2 na^2 + \qquad (5)$$

Since the left parts of Eqs (1) and (5) are equal, the right parts most also be equal But they are not equal Therefore the initial suggestion about the force depending on acceleration is wrong

Besides R A. Waldron's proof and Assis's result there are many other contradictions due to the force law, depending on acceleration We will not dwell on them, as this force law contradicts the essence of force

If one body acts on another, then the resulting effect is an acceleration of the second body, *i e* the acceleration is expression of this effect On other hand, man measures the effect with the help of a force In this way, he counteracts the body's motion by means of a third body, *e g* , a spring, and its deformation defines the magnitude of the force Therefore, the force and the acceleration define the action on the body They are the same (*N B* the acceleration exists objectively but a force is introduced by man to describe the effect on the body) The coefficient of proportionality (m) between the force and the acceleration is due to the choice of standards (*e g* , the platinum-iridium cylinder with height and diameter 39 mm, which we call a kilogram) by means of which we establish units of measurement of the acceleration and force Thus, Newton's second law $F = ma$ expresses the equivalence of force and acceleration

So, if we establish the force, then an acceleration is defined By integration we can find the speed $v(t)$, and direction $S(t)$, *i e.* we find all parameters of the body's motion Hence, the force cannot depend on acceleration, it can depend only on velocity and distance, which are relative to the acting body

This error, that force depends on acceleration, also exists in Fluid Mechanics, where we have Basse's force and the force of joining masses

a (2) -0.5

$$\vec{F}_B = -\frac{3d^2 \rho (\pi \nu)^{-0.5}}{2} \int_{t_o}^{t} (t - \tau)^{-0.5} \vec{a}\, dt, \qquad (6)$$

$$\vec{F}_{jm} = -\frac{\pi l^3 \rho}{12} \vec{a}$$

It is considered that these forces act on a particle which moves in a fluid with acceleration $\vec{a}$

In Electrodynamics and Fluid Mechanics this forces have been introduced theoretically But forces must be founded on experimental data Based on experimental data, I (Smulsky 1994) have derived expressions for the force with which the moving charge q_1 acts on a stationary charge q_2 (in Gauss's units)

$$\vec{F}_q = q_2 \vec{E}_{i1} = \frac{q_1 q_2 (1 - \beta^2) \vec{R}}{\varepsilon \left[R^2 - (\vec{\beta} \times \vec{R})^2 \right]^{3/2}} \qquad (7)$$

where $\beta = \vec{v}/c_1$, and $c_1 = c/\sqrt{\varepsilon \mu}$ is the electromagnetic velocity or velocity of light in space with permittivity ε and permeability μ, $\vec{v}$ is the velocity of charge q_1

The moving charge acts on the magnet pole with force

$$\vec{F}_M = \mu M \vec{H}_{i1} = \frac{\mu M q_1 (1 - \beta^2) \left[\vec{\beta} \times \vec{R} \right]}{\sqrt{\varepsilon \mu} \left[R^2 - (\dot{\beta} \times \dot{R})^2 \right]^{3/2}} \qquad (8)$$

where M is the magnetic charge

The forces (7) and (8) allow us to calculate all phenomena of the electrodynamics of moving charges In this case, the mass, time and distance do not depend on the charge velocity

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