THE POST EINSTEIN PARADIGM SHIFT: REFUTATIONS OF EINSTEINIAN RELATIVITY IN SPHERICALLY SYMMETRIC SPACETIMES.

by

M .W. Evans and H. Eckardt.

Civil List, AIAS and UPITEC

(www.aias.us, www.webarchive.org.uk, www.upitec.org, www.atomicprecision.com, www.et3m.net)

ABSTRACT

It is shown that any relativity theory based on the Schwarzschild type of infinitesimal line element is self contradictory in a spherically symmetric spacetime. This result is independent of any field equation. The Einstein / Schwarzschild general relativity is refuted conclusively by this new theorem. It follows that the well known Einsteinian theories are obsolete: perihelion precession, the deflection of light due to gravitation, the gravitational red shift, the theory of gravitational radiation, the theory of frame dragging, the theory of gravitational time delay, the theory of black holes, the cosmological red shift and the big bang theory of cosmology. In the post Einstein era the search has begun for a new relativity based on the ECE theory of unified physics.

Keywords: The post Einstein paradigm shift, refutations of Einsteinian general relativity, ECE theory of unified physics.

UFT 201

1. INTRODUCTION

In recent papers of this series {1 - 10} the standard Einsteinian theory of relativity has been refuted conclusively in spherically symmetric spacetimes defined by the so called "Schwarzschild" metric (UFT190 ff and UFT200 on www.aias.us). In historical truth {11} Schwarzschild did not give this erroneous solution. The correct solution {11} does not have a singularity and does not predict such dogmatic ideas as "black holes". In the late nineteen fifties the Einsteinian general relativity was refuted completely by experimental data from galaxies, notably the velocity curve. It is therefore not possible to assert that the same theory has been tested with great precision with other data - from the solar system. This dogmatic adherence to an experimentally refuted theory characterized general relativity in the late twentieth century, and dogma is scientifically worthless. These refutations lead us into the post Einsteinian era characterized by a major paradigm shift of natural philosophy.

In Section 2 the refutation is given of a relativity theory in any Schwarzschild type spherically symmetric spacetime based on an infinitesimal line element. The methods of the Einstein theory itself are used to show straightforwardly that the theory is self contradictory and flawed irretrievably. It is plain wrong. This paradigm shift is therefore different in nature from those such as quantum mechanics, in which the original theory, classical mechanics, is considered to be correct within limits. Well known geometrical methods {12} are used to define the most general infinitesimal line element of the spherically symmetric spacetime, and the standard lagrangian methods of relativity applied in precisely the same way as in general relativity with the commonly called "Schwarzschild" metric. Therefore in Section 2 the standard methods of Einsteinian relativity are used to show that the Schwarzschild type theory is self contradictory and collapses in all spherically symmetric spacetimes or mathematical spaces of any dimension. This result is true irrespective of any constraint supplied by any field equation.

In Section 3 some absurd consequences of the "Schwarzschild" metric are reviewed.

2. REFUTATION IN THE SPHERICALLY SYMMETRIC SPACETIME

Consider the most general infinitesimal line element of spherically symmetric spacetime {12}:

$$ds^2 = c^2 d\tau^2 = m(r,t)c^2 dt^2 - n(r,t)dr^2 - r^2 d\theta^2 \qquad (1)$$

in cylindrical polar coordinates (r, θ). The theory is developed for the sake of clarity and simplicity in the plane defined by:

$$dZ^2 = 0 \qquad (2)$$

but can be developed also in spherical polar coordinates and any system of coordinates in a mathematical space with any number of dimensions.. Here τ is the proper time, c is the speed of light in vacuo, t the time in the observer frame, and in general m (r, t) and n(r, t) are any two functions of r and t. By definition:

$$d\underline{r} \cdot d\underline{r} = v^2 dt^2 = n(r,t)dr^2 + r^2 d\theta^2 \qquad (3)$$

where the total velocity v in the observer frame is defined by:

$$v^2 = n(r,t)\left(\frac{dr}{dt}\right)^2 + r^2\left(\frac{d\theta}{dt}\right)^2. \qquad (4)$$

Therefore:

$$ds^2 = c^2 d\tau^2 = n(r,t)c^2 dt^2 - d\underline{r} \cdot d\underline{r}. \quad -(5)$$

The methods of Einsteinian relativity {12} are based on the definition of the lagrangian:

$$\mathcal{L} = \frac{1}{2}mc^2 = \frac{1}{2}\left(mn(r,t)c^2\left(\frac{dt}{d\tau}\right)^2 - mn(r,t)\left(\frac{dr}{d\tau}\right)^2 - mr^2\left(\frac{d\theta}{d\tau}\right)^2\right) \quad -(6)$$

where m is the mass of a particle or an object such as a planet in a planar orbit. The Euler Lagrange equations give two constants of motion as is well known, the total energy E and the total angular momentum L. These are conserved quantities because of the principles of conservation of total energy and conservation of total momentum. They are:

$$E = n(r,t)mc^2\frac{dt}{d\tau} \quad -(7)$$

and

$$L = mr^2\frac{d\theta}{d\tau}. \quad -(8)$$

From Eqs. (3) and (5):

$$\frac{dt}{d\tau} = \left(n(r,t) - \frac{v^2}{c^2}\right)^{-1/2}. \quad -(9)$$

In special relativity:

$$n(r,t) \rightarrow 1 \quad -(10)$$

so Eq. (9) reduces to the Lorentz factor.

Using the chain rule of differentiation:

$$\frac{d\theta}{d\tau} = \frac{d\theta}{dt}\frac{dt}{d\tau} = \omega\frac{dt}{d\tau}. \quad -(11)$$

It follows from Eqs. (7) and (8) that the angular velocity is:

$$\omega = \frac{d\theta}{dt} = \frac{cbn(r,t)}{r^2} \quad -(12)$$

where

$$b = \frac{Lc}{E}. \quad -(13)$$

From Eq. (1):

$$mc^2 = mn(r,t)c^2\left(\frac{dt}{d\tau}\right)^2 - mn(r,t)\left(\frac{dr}{d\tau}\right)^2 - mr^2\left(\frac{d\theta}{d\tau}\right)^2.$$

$$= \frac{E^2}{n(r,t)mc^2} - mn(r,t)\left(\frac{dr}{d\tau}\right)^2 - \frac{L^2}{mr^2}. \quad -(14)$$

Therefore:

$$mn(r,t)\left(\frac{dr}{d\tau}\right)^2 = \frac{E^2}{n(r,t)mc^2} - mc^2 - \frac{L^2}{mr^2}. \quad -(15)$$

Apply to this equation the chain rule:

$$\frac{dr}{d\tau} = \frac{dr}{d\theta}\frac{d\theta}{d\tau} = \frac{L}{mr^2}\frac{dr}{d\theta} \quad -(16)$$

to obtain:

$$\frac{mn(r,t)L^2}{m^2r^4}\left(\frac{dr}{d\theta}\right)^2 = \frac{E^2}{n(r,t)mc^2} - mc^2 - \frac{L^2}{mr^2} \quad -(17)$$

The orbital equation is therefore:

$$\left(\frac{dr}{d\theta}\right)^2 = \frac{mr^4}{n(r,t)L^2}\left(\frac{E^2}{m(r,t)mc^2} - mc^2 - \frac{L^2}{mr^2}\right)$$

$$= \frac{r^4}{n(r,t)}\left(\frac{1}{m(r,t)b^2} - \left(\frac{1}{a^2} + \frac{1}{r^2}\right)\right)$$

where: $\quad -(18)$

$$a = \frac{L}{mc}, \quad b = \frac{Lc}{E}. \quad -(19)$$

Now use the chain rule again to find that:

$$\left(\frac{dr}{dt}\right)^2 = \omega^2\left(\frac{dr}{d\theta}\right)^2 = \left(\frac{cbm(r,t)}{r^2}\right)^2\left(\frac{dr}{d\theta}\right)^2 \quad -(20)$$

$$= \frac{c^2 m(r,t)}{n(r,t)}\left(1 - b^2 m(r,t)\left(\frac{1}{a^2} + \frac{1}{r^2}\right)\right).$$

From Eq. (4) the total velocity v is:

$$v^2 = c^2 m(r,t)\left(1 - b^2 m(r,t)\left(\frac{1}{a^2} + \frac{1}{r^2}\right)\right) + \left(\frac{cbm(r,t)}{r^2}\right)^2$$

$$= c^2 m(r,t)\left(1 - \left(\frac{mc^2}{E}\right)^2 m(r,t)\right). \quad -(21)$$

Note carefully that the total velocity does not depend on n (r, t), and that Eq. (21) is the same result as obtained in UFT194 for the "Schwarzschild" metric. From Eqs. (7), (8) and (9) an independent expression is obtained for m (r, t) in terms of the total linear velocity:

$$m(r,t) = \frac{1}{2}\left(\frac{E}{mc^2}\right)\left(1 \pm \left(1 - \frac{4v^2}{c^2}\left(\frac{mc^2}{E}\right)^2\right)^{1/2}\right) \quad -(22)$$

The Schwarzschild type line element is defined by:

$$m(r,t) = m(r) = 1 - \frac{r_0}{r} = n^{-1}(r). \quad -(23)$$

In this case, the orbit is defined by:

$$\left(\frac{dr}{d\theta}\right)^2 = r^4\left(\frac{1}{b^2} - \left(1 - \frac{r_0}{r}\right)\left(\frac{1}{a^2} + \frac{1}{r^2}\right)\right). \quad -(24)$$

This is claimed in the Einstein / Schwarzschild theory to be the orbit of a precessing ellipse.

However, a precessing ellipse is defined by:

$$r = \frac{\alpha}{1 + \epsilon\cos(x\theta)} \quad -(25)$$

where 2α is the right latitude, ϵ is the eccentricity and x is the precession constant.

It follows from Eqs. (24) and (25) that:

$$\sin^2(x\theta) = \left(\frac{\alpha}{x\epsilon}\right)^2\left(\frac{1}{b^2} - \left(1 - \frac{r_0}{r}\right)\left(\frac{1}{a^2} + \frac{1}{r^2}\right)\right)$$

$$= \left(\frac{\alpha}{x\epsilon}\right)^2\left(\frac{1}{b^2} - \frac{1}{a^2} + \frac{r_0}{a}\frac{1}{r} - \frac{1}{r^2} + \frac{r_0}{r^3}\right). \quad -(26)$$

However, from Eq. (25):

$$\sin^2(x\theta) = \left(1 - \frac{1}{\epsilon^2}\right) + \frac{2\alpha}{\epsilon^2}\frac{1}{r} - \left(\frac{\alpha}{\epsilon}\right)^2\frac{1}{r^2}. \quad -(27)$$

Clearly, Eqs. (26) and (27) are not the same, thus refuting the Einstein / Schwarzschild theory.

The "Schwarzschild" metric assumes that m (r, t) varies with r as follows:

$$m(r,t) = m(r) = 1 - \frac{r_0}{r} \qquad -(28)$$

so is refuted directly. Here r_0 is the "Schwarzschild" radius. The correct Schwarzschild metric of a letter of December 1915 from him to Einstein is in fact {11}:

$$m(r) = 1 - \frac{\gamma}{(r^3 + \alpha^3)^{1/3}} \qquad -(29)$$

but is also refuted directly by Eq. (27).

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The post Einstein paradigm shift: refutations of Einsteinian relativity in spherically symmetric spacetimes

M. W. Evans*and H. Eckardt†
Civil List, A.I.A.S. and UPITEC

(www.webarchive.org.uk, www.aias.us,
www.atomicprecision.com, www.upitec.org)

3 The singularities in the function $n(r,t)$

In this section we show that a particle moving in an elliptical orbit cannot be described consistently by the function $n(r,t)$. In section 2 it was shown that $m(r,t)$ has the general constant form given by Eq.(23). For a general spherical spacetime, there is a general interrelation between the orbital derivative $dr/d\theta$ and the function $n(r,t)$ which is given by Eq.(26). A particle moving on an ellipse is described by

$$r = \frac{\alpha}{1+\epsilon\cos(x\,\theta)} \tag{42}$$

(Eq.(28)) with

$$\frac{dr}{d\theta} = \frac{\alpha\,\epsilon\,x\sin(x\,\theta)}{(\epsilon\cos(x\,\theta)+1)^2} = \frac{\epsilon\,r^2\,x\sin(x\,\theta)}{\alpha}. \tag{43}$$

Inserting this into the squared Eq.(26) gives

$$n(r,t) = \left(\frac{\alpha}{\epsilon\,x}\right)^2 \frac{1}{\sin(x\,\theta)^2}\left(\frac{m\,E}{L^2}+\frac{1}{r^2}\right). \tag{44}$$

Using (42) we can replace

$$\sin(x\,\theta)^2 = 1-\cos(x\,\theta)^2 = 1-\left(\frac{\alpha-r}{\epsilon r}\right)^2 \tag{45}$$

which leads to a pure r dependence of the function $n(r,t)$ in Eq.(44):

$$n(r,t) = \frac{\alpha^2\,\left(L^2+m\,E\,r^2\right)}{x^2\,L^2\,((\epsilon-1)\,r+\alpha)\,((\epsilon+1)\,r-\alpha)}. \tag{46}$$

*email: emyrone@aol.com
†email: horsteck@aol.com

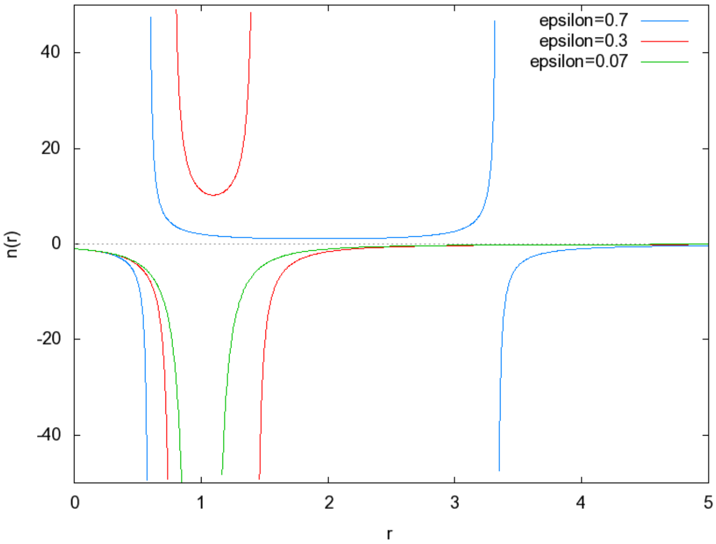

Figure 1: $n(r)$ for elliptical orbits of different eccentricity ϵ with parameters $\alpha = x = E = m = 1, L = 10$.

This is the final result for $n(r,t)$ in case of a precessing elliptical orbit. The limits for the r coordinate are

$$\lim_{r \to 0} n(r,t) = -\frac{1}{x^2} \tag{47}$$

and

$$\lim_{r \to \infty} n(r,t) = -\frac{\alpha^2\, m\, E}{\left(1 - \epsilon^2\right)\, x^2\, L^2}. \tag{48}$$

Both are well defined. Hoewever, function (46) has two divergent points, namely for

$$r = \frac{\alpha}{1 \pm \epsilon}. \tag{49}$$

These are the minum and maximum elliptical radius (points of return). Since these points are definitly part of the orbit, this means that $n(r,t)$ diverges for two points and is not defined there. This can be seen from the graphical representation in Fig. 1 where n(r) is shown for three characteristic values of ϵ. There are broad regions of divergence in each case. We therefore conclude that it is not possible to describe elliptical orbits by a well defined function $n(r,t)$. The metric of Eq.(1) has a singularity. Together with the contradictions found for $m(r,t)$ this means that metric based General Relativity is meaningless.