NEWTONIAN THEORY OF THE PERIHELION PRECESSION.

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ABSTRACT

It is shown that it is possible to describe the precession of the perihelion of planets with a Newtonian theory. Therefore general relativity is not necessary in this context and the Newtonian theory is preferred by Ockham's Razor. In other contexts general relativity is still necessary although it is now known that both perihelion precession and light bending by gravitation can be described by a Newtonian theory.

Keywords: ECE theory, Newtonian theory of perihelion precession.

UFT 204

1. INTRODUCTION

In recent papers of this series {1 - 10} it has been shown that the phenomenon of light bending by gravitation can be described with a Newtonian theory which is also capable of measuring the mass of the photon at an order of magnitude of 10^{-57} kilograms (UFT202 on www.aias.us). It has also been shown that Einsteinian general relativity is riddled with errors, large and small, and that theory has been replaced by new ideas free of dogma. In Section 2 it is shown that the precession of the perihelion of an orbit of an object of mass m can be described straightforwardly with a Newtonian theory. The latter is considerably simpler than general relativity and is preferred in this context by Ockham's Razor. In other contexts, such as the construction of a unified field theory, general relativity is necessary, and special relativity is known to be a very precise theory. Newtonian dynamics are obviously not capable of constructing a unified field theory, and as also shown in this series {1 - 10}, has major conceptual problems of its own. The aim of this simple paper is to show that the much vaunted calculation of precession by Einstein {11} is not only incorrect but also not necessary. The incorrectness of the Einstein theory was first pointed out by Schwarzschild {12} in December 1915, but the latter's correction was not only ignored for nearly a century but also distorted into the infamous "Schwarzschild metric" of the textbooks. In UFT202 it was shown very clearly that this fabricated metric does not produce a precessing ellipse at all, and that has also been shown in other ways in UFT190 ff. (www.aias.us). These demonstrations are so simple that to ignore them would be utterly unscientific.

2. NEWTONIAN THEORY OF THE PERIHELION PRECESSION.

Consider the equation of the ellipse:

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

Here α is the half right magnitude, ϵ the eccentricity, and (r, θ) the cylindrical polar coordinates in the plane of the orbit, defined by:

$$dz^2 = 0. \qquad -(2)$$

It is well known that the ellipse is a conical section defined by an eccentricity of less than unity {13, 14}. It is also well known that any conical section is produced by the total energy:

$$E = T + V \qquad -(3)$$

of the Newtonian theory. Here T is the kinetic energy:

$$T = \frac{1}{2} m v^2 \qquad -(4)$$

defined by the square of the total velocity:

$$v^2 = \left(\frac{dr}{dt}\right)^2 + r^2 \left(\frac{d\theta}{dt}\right)^2 \qquad -(5)$$

and V is the Newtonian potential energy defined by:

$$V = -\frac{mMG}{r} \qquad -(6)$$

where G is Newton's constant, M is the attracting mass and m the attracted mass. In the seventeenth century ideas of Newton V generates an inverse square force of attraction:

$$F = -\frac{\partial V}{\partial r} = -\frac{mMG}{r^2} \quad - (7)$$

It may be shown {13, 14} that the ellipse or any conical section is obtained from the total

energy E provided that the half right latitude is:

$$\alpha = \frac{L^2}{m^2 M G} \quad - (8)$$

and that the eccentricity is:

$$\epsilon = \left(1 + \frac{2L^2 E}{m^3 M^2 G^2} \right)^{1/2} \quad - (9)$$

In the solar system the orbit is observed to be a precessing ellipse:

$$r = \frac{\alpha}{1 + \epsilon \cos(x\theta)} \quad - (10)$$

where x is the precession constant. In order to generate a precessing ellipse from a static

ellipse (**1**) the following is necessary:

$$\theta \rightarrow x\theta \quad - (11)$$

i.e. the coordinate θ is changed to $x\theta$ in all occurrences. The lagrangian of the

Newtonian theory is therefore modified by eq. (**11**) to:

$$\mathcal{L} = \frac{1}{2}m\left(\left(\frac{dr}{dt}\right)^2 + r^2\left(\frac{d(x\theta)}{dt}\right)^2 \right) + \frac{mMG}{r} \quad - (12)$$

$$= \frac{1}{2}m\left(\left(\frac{dr}{dt}\right)^2 + r^2 x^2 \left(\frac{d\theta}{dt}\right)^2 \right) + \frac{mMG}{r}.$$

The second line follows because x is constant for a given orbit. The relevant Euler Lagrange

equation is {13, 14}:

$$\frac{\partial \mathcal{L}}{\partial \theta} = \frac{d}{dt} \frac{\partial \mathcal{L}}{\partial \dot{\theta}} = 0. \quad - (13)$$

The constant total angular momentum is defined by:

$$L = \frac{\partial \mathcal{L}}{\partial \dot{\theta}} = x^2 m r^2 \frac{d\theta}{dt} \quad - (14)$$

and the constant total energy is defined by:

$$E = \frac{1}{2} m \left(\left(\frac{dr}{dt}\right)^2 + x^2 r^2 \left(\frac{d\theta}{dt}\right)^2 \right) - m\frac{MG}{r}$$

$$= \frac{1}{2} m \left(\frac{dr}{dt}\right)^2 + \frac{L^2}{2mx^2 r^2} + U. \quad - (15)$$

The second term in the second line of this equation is the rotational kinetic energy. However it is asserted in the Newtonian dogma to be the centrifugal energy that generates the centrifugal force of repulsion. This mixture of concepts is used routinely but nevertheless it is untenable, as shown in recent papers of this series (UFT190 ff. on www.aias.us). The purpose of this paper however is to show that a Newtonian theory can produce a precessing ellipse, so this mixture of concepts is set aside for the sake of argument.

From Eq. (15):

$$\frac{dr}{dt} = \left(\frac{2}{m} \left(E - U - \frac{L^2}{2mx^2 r^2} \right) \right)^{1/2}. \quad - (16)$$

Now use:

$$\frac{d\theta}{dr} = \frac{d\theta}{dt} \frac{dt}{dr} \qquad -(17)$$

where:

$$\frac{d\theta}{dt} = \frac{L}{mx^2 r^2} \qquad -(18)$$

to obtain the orbital equation:

$$\left(\frac{dr}{d\theta}\right)^2 = \frac{2mx^4 r^4}{L^2}\left(E - U - \frac{L^2}{2mx^2 r^2}\right). \qquad -(19)$$

From Eq. (10):

$$\left(\frac{dr}{d\theta}\right)^2 = \frac{x^2 \epsilon^2 r^4}{\alpha^2}\left(1 - \frac{1}{\epsilon^2}\left(\frac{\alpha}{r} - 1\right)^2\right). \qquad -(20)$$

Comparing Eqs. (19) and (20) gives:

$$\alpha = \frac{L^2}{x^2 m^2 MG} \qquad -(21)$$

and:

$$\epsilon = \left(1 + \frac{2L^2 E}{x^2 m^3 M^2 G^2}\right)^{1/2}. \qquad -(22)$$

So a Newtonian theory can produce a precessing elliptical orbit straightforwardly. Not only is Einstein's 1915 calculation { 11, 12 } incorrect but it is also unnecessary by Ockham's Razor. Also, the practical determination of the precession is complicated considerably by the

gravitation of other planets as is well known, and perihelion precession is an exceedingly poor choice of experiment with which to challenge Newtonian dynamics. In the solar system x - 1 is very small indeed, so this is another reason why the experimental "confirmation" of general relativity by this method is incorrect. In UFT202 it was shown very simply that the Einstein theory does not produce a precessing ellipse (10) at all.

ACKNOWLEDGMENTS

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