419(3): Self Inconsistency of the S2 Analysis in the Standard Model.

The standard modellers assume that the S2 orbit is Keplerian or Newtonian:

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

where α is the half right latitude and ϵ is the eccentricity.
In this case the orbital velocity is:

$$v^2 = MG\left(\frac{2}{r} - \frac{1}{a}\right) \quad -(2)$$

and the central mass M is:

$$M = \frac{v^2}{G\left(\frac{2}{r} - \frac{1}{a}\right)} \quad -(3)$$

Then v, r and a are measured at closest approach and M estimated.

This is a routine Newtonian analysis, but it is claimed that M is a supermassive black hole that verifies the EGR theory. There is no evidence at all for the existence of a supermassive black hole, which is based on an incorrect geometry.

The Einsteinian theory is based on:

$$ds^2 = c^2 d\tau^2 = n(r)c^2 dt^2 - \frac{dr^2}{n(r)} - r^2 d\phi^2 \quad -(4)$$

with

$$n(r) = 1 - \frac{r_0}{r} \quad -(5)$$

As in UFT192, Eq. (6), eqs. (4) and (5) give:

$$\frac{dr}{d\phi} = r^2\left(\frac{1}{b^2} - n(r)\left(\frac{1}{a^2} + \frac{1}{r^2}\right)\right)^{1/2} \quad -(6)$$

where $n(r)$ is given by Eq. (5). The orbit can be

2) calculated from eq. (6) in which:

$$a = \frac{L}{mc}, \quad b = \frac{Lc}{E} \qquad -(7)$$

The Einsteinian method gives an effective potential from eqs. (5) and (6), and this is claimed to give the precession:

$$\Delta\phi = \frac{6\pi MG}{c^2 a(1-\epsilon^2)} \qquad -(8)$$

However, the Newtonian orbit (1) is obtained from the potential:

$$U = -\frac{mMG}{r} \qquad -(9)$$

and gives:

$$\Delta\phi = 0. \qquad -(10)$$

In the S2 data analysis there is no experimental measurement of precession. Clearly this analysis does not prove EGR.

In a well defined approximation of m theory the central mass is given by:

$$M = \frac{v^2}{m(r)^{3/2}\left(\frac{2m(r)^{1/2}}{r} - \frac{1}{a}\right)G} \qquad -(11)$$

and the orbit is found from:

$$\frac{dH}{dt} = 0 \qquad -(12)$$

and

$$\frac{dL}{dt} = 0 \qquad -(13)$$

where

$$H = m(r)\gamma mc^2 - m(r)^{1/2}\frac{mMG}{r} \qquad -(14)$$

and

$$L = \frac{\gamma m r^2 \dot{\phi}}{m(r)} \qquad -(15)$$

In eqs. (14) and (15):

$$\gamma = \left(m(r) - \frac{\dot{r}^2 + r^2\dot{\phi}^2}{m(r)c^2} \right)^{-1/2} \quad -(16)$$

Eqs. (14) to (16) give:

$$\ddot{r} - \dot{\phi}^2 r = \frac{dm(r)}{dr}\left(c^2 m(r) + \frac{MG}{2\gamma^3 r\, m(r)^{1/2}} - \frac{3c^2}{2\gamma^2} \right)$$
$$- \frac{1}{m(r)}\frac{dm(r)}{dr}\dot{\phi}^2 r^2 \left(2 - \frac{MG}{2\gamma c^2 m(r)^{1/2}} \right) - MG\left(\frac{m(r)^{1/2}}{\gamma^3 r^2} + \frac{\dot{\phi}^2}{\gamma c^2 m(r)^{1/2}} \right) \quad -(17)$$

and

$$r\ddot{\phi} + 2\dot{\phi}\dot{r} = r\dot{\phi}\dot{r}\left(\frac{1}{m(r)}\frac{dm(r)}{dr}\left(2 - \frac{MG}{2\gamma c^2 r\, m(r)^{1/2}} \right) + \frac{MG}{\gamma c^2 r^2 m(r)^{1/2}} \right) \quad -(18).$$

The S2 orbit must be found by integrating eqs. (17) and (18) numerically.

The Newtonian limit of Eqs. (17) and (18) used by the standard modellers is:

$$\ddot{r} - \dot{\phi}^2 r = -\frac{MG}{r} \quad -(19)$$

and

$$\ddot{\phi} r + 2\dot{\phi}\dot{r} = 0 \quad -(20)$$

Eqs. (19) and (20) give eqs. (1) and (10), i.e. a Newtonian orbit with no precession.

Eqs. (17) and (18) give many different kinds of orbit with precession. They can give forward and retrograde precession.

The initial conditions for eqs. (17) and (18)

4) are given by:

$$r_0 = 1.7952 \times 10^{13} \text{ m} \quad -(21)$$

$$v_0 = 7.650 \times 10^{6} \text{ ms}^{-1} \quad -(22)$$

from the closest approach of S2 to the central mass M of 18th May 2018.

The data (21) and (22) completely refute the standard model analysis because they do not give an orbit, they do not give bound states.

The $m(r)$ function used for the computation was calculated from:

$$v^2 = m(r)^{3/2} MG \left(\frac{2m(r)^{1/2}}{r} - \frac{1}{a} \right) \quad -(23)$$

with

$$M = 8.572 \times 10^{36} \text{ kgm} \quad -(24)$$

$$a = 1.451 \times 10^{14} \text{ m} \quad -(25)$$

as given by Wikipedia. However, M is estimated from the Newtonian (13) and this is a diametric self inconsistency in the standard model.

Suggested Self Consistent procedure

1) In the first approximation use eq. (24) in integrating eqs. (17) and (18).

2) Use the observed initial conditions (21) and (22).

3) Vary $m(r)$ to give an orbit and observe the type of precession, is it forward or retrograde.