

# Review of: "On the existence of precession of planets' orbits in Newtonian gravity"

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This paper deals with an interesting item but from a wrong point of view. The author argues that the Sun is not an inertial frame and this is the cause of precession. He is right in the first assertion but wrong in the second one. His confusion comes from an insufficient knowledge of the solution to the two-body problem. This solution states that under an attractive potential proportional to  $1/R$ , one body follows an ellipse around the other body placed at one focus of the ellipse having the reduced mass of both bodies as the apparent mass of this relative motion. Of course, the focus of the ellipse is not an inertial frame, but things happen as it were an inertial frame but changing the actual mass for the reduced mass, and there is not perihelion pecession. The accuracy of this result has been checked in quantum mechanics. The Rydberg constant at infinite includes the electron mass. However, the measured spectra are fitted with a Rydberg constant where the electron mass is replaced with its reduced mass with the nucleous of the atom under consideration. Any electrostatic or gravitational field proportional to  $1/R^2$  yields closed ellipses without precession. This is true in Newtonian mechanics even for binay star systems. Periapsis precession arises when the field profile separates from  $1/R^2$ . In the solar system, perihelion precession happens because the other planets generate additional gravitational fields. Fitzpatrick has calculated them and perihelion precession by modeling the planetary orbits as rings of matter. In the case of Mercury, Einstein discovered that there is additional precession because the Schwarzschild field separates from  $1/R^2$ . This difference becomes smaller as going away from the Sun. Therefore, playing with Mecury's mass makes no sense. Accoding to the solution to the two-body problem, the third Kepler's law includes the addition of the masses of the Sun and of the planet, not only that of the Sun. It is right that the Sun is not an inertial frame. But this is not the trouble if Mercury is only considered owing to the solution to the two-body poblem. In fact, the mass of Mercury is insignificant with respect to the Sun. The trouble is that the track of the Sun is mainly conditioned by Jupiter and Saturn affecting Mercury. The orbital periods of Jupiter and Saturn are 11.86 and 29.46 years while Mecury's obital period is 0.24 years. It means that Mercury can easily adapt to the variations of the position of the Sun. Although the fact that the Sun does not follow an ellipse with respect to the center of the mass of the solar system is a serious trouble to compute perihelion precession, the solution is not that given in this paper. On the other hand, the author takes  $R-R_0$  as a hamonic oscillator. This is only an appoximation that could cause apparent precession. The variable  $1/R-1/R_0$  exactly behaves as a harmonic oscillator and it is the suitable variable to calculate the very small perihelion precession rates.