

Gravitation Question on *Perihelion Advance*

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November 13, 2017

Abstract

We formulate and discuss, as much as we can, an inevitable mathematical and philosophical question: why do the *General Theory of Relativity* and the *Relative-Velocity Dependence of Gravitational Interaction* lead to the same well-known formula for the anomalous *Perihelion Advance*?

As well known, the formula for the anomalous *Perihelion Advance/Rotation/Precession/Shift* is, in usual notations,

$$\delta = \frac{6\pi GM}{c^2(1 - e^2)a}.$$

This was found out by Gerber (1898) [1] from some premises later regarded as inconsistent, and the inference, unclear.

A consistent and clear inference was put forward by Einstein (1916) [2] using his newly created GTR¹. Thus

Proposition 1 *The Perihelion Advance is a relativistic effect.*

We have put forth [3] a clear, rather short, and elegant inference using the RVD² completion of the Newton universal gravitation law, using no other hypothesis. Hence

Proposition 2 *The Perihelion Advance is an effect of RVD of interaction.*

The tough question now is why do the two propositions, 1 and 2, coexist? or, in other words, which is the subtle communication tunnel between the two different points of viewing gravitation?

The lack of this answer appears as an urgent unsolved problem in Physics. One expects either a mathematical or a philosophical explanation, or both.

May the answer lie in the way the Riemann/curvature tensor is constructed, i.e., in assigning its components?

¹GTR means General Theory of Relativity.

²RVD means Relative-Velocity Dependence/Dependent (according to context).

References

- [1] Gerber, P. (1898), *Zeitschrift für Mathematik und Physik*, **43**, 93—104.
- [2] Einstein, A. (1916), *Annalen der Physik*, **49**, 769—822.
- [3] Reffer, D.H.W., (2017), <http://viXra.org/abs/1710.0091?ref=9606220> .