What's Wrong with General Relativity? (2)

by Paul R. Gerber

Gerber Molecular Design, Forten 649, CH-8873 Amden

Email: Paul.Gerber@moloc.ch

95.30.Sf Relativity and gravitation

98.80.Jk Mathematical and relativistic aspects of cosmology

Abstract

Field-theoretical arguments are advanced which question the validity of the theory of General Relativity. In particular, we expect that retardation effects will substantially modify it's result for the perihelion shift of Mercury.

Remark

In an earlier remark [1] we questioned the validity of the theory of General Relativity (GR) on the grounds of a missing consistency between Einstein's Equivalence Principle, from which it is derived, and the emission of gravitational waves of accelerated masses. Here we present additional arguments that question whether one of it's results, the perihelion shift of Mercury, can be considered final.

In General Relativity (GR) gravitation is described by the geometry of the space-time continuum of the universe. As such it is at first a static theory (meaning with instantaneous transmission of forces), and this is also the nature of the currently accepted explanation of the perihelion shift of Mercury. It was clear from the beginning that this could not be the last word, because Special Relativity requires that no information could be transported faster than with the speed of light. Consequently, a theory for gravitational waves was added to GR [2], which, however, met with serious difficulties [3]. Nowadays, this theory seems to be well accepted [4], although it must be questioned whether such acceptance is justified, as long as the corresponding field, the metric tensor, resists quantization.

Furthermore, one would expect that the planets experience a retarded gravitational field of the sun, although it is not quite clear, even nowadays, how this should come about with a static field. Since retardation leads to a perihelion shift of the same size (as derived with GR) by itself, as already shown at the end of the 19^{th} century [5], we would expect that a similar correction should also affect the result of GR, once we now how to perform the corresponding calculation. Consequently, one must question, whether GR's current explanation of Mercury's perihelion shift can be considered the last word, or whether the agreement with experiment is not just fortuitous, or perhaps rather fatal.

At first sight it is not clear, how retardation should come about in a static field and there seems to have been an early (apparently unresolved) discussion on the topic [3]. This uncertainty is also reflected by the fact that a quantum-field theoretical description of static fields in general (also electromagnetic) still seems to be missing. (A truly static field has energy and is, thus, a massive field!) We have presented a proposal to that point, in which, what is termed a static field, is actually a stationary mass current from sources to sinks [6], and as such it must show retardation. However, the corresponding full theory has

not been worked out in detail as yet, although it was shown how diagrams would have to be modified in principle.

In conclusion, we question, whether the agreements of GR with experiments, which are considered it's corner stones, are really above all doubts. In particular, we expect that GR's result on Mercury's perihelion shift will experience substantial modification by retardation effects, when a treatment within a theory of quantum gravity is performed (if that is ever going to happen for GR).

References

1. Gerber P. R., (2015), viXra:1502.0067
2. Einstein A., Sitzungsberichte der Koeniglichen Preussischen Akademie der Wissenschaften, part 1, 688 (1916), 154 (1918)
3. Kennefik D., (2007), Traveling at the Speed of Thought, Princeton University Press
4. Creighton J. D. E., Anderson W. G., (2011), Gravitational-Wave Physics and Astronomy, Wiley-VCH
5. Gerber P., (1898), Zeitschrift fuer Mathematik und Physik. 43, p. 93–104; english translation: http://www.alternativephysics.org/gerber/Perihelion.htm
6. Gerber P. R., (2015), viXra:1505.0078