Review of: "The quantum origins of gravity"

Alexandre Landry[1]

1 Dalhousie University

Potential competing interests: No potential competing interests to declare.

The paper develops many fundamental ideas and presents another vision of the problem of gravitational interaction. We propose to describe gravitation and spacetime in terms of the electrical permittivity of the ambient medium (taking into account the masses in presence) instead of spacetime curvature (R), torsion (T), or non-metricity (Q) of spacetime. Obviously, if the speed of light varies with this permittivity, the redshift will also depend on this variation in permittivity. And afterward, we evaluate the consequences for the masses, the interactions between them, and the lower limit of gravitational acceleration. In short, we present here another vision of gravitation. The exercise seems to have been quite successful.

However, there is a way to complete this work by considering the following points:

1. At the end of section 2, we should also discuss the speed of gravity. For example, we should take into account the work of S. Carlip (arXiv:gr-qc/9909087 and gr-qc/0403060) for a coherent explanation. There was even a proposal for an experimental interferometry setup (arXiv:1208.2293) to measure this speed of gravity.
2. We say at the end of section 5 that the gravitational constant G can vary depending on the environments and the type of physical system. Just before (between tables 2 and 3), we say that there was a measurement of G with some variations. We explain the latter by variations in redshift in the case of large mass ratios. Several experiments have been proposed to measure G more precisely. We should discuss these experiments more, particularly in microgravity (arXiv:2005.05798, 2005.10631, and 1910.13814, to name only a few). We talk not only about measuring G with great precision, but also about measuring Yukawa-type parameters or even inverse power-laws interactions in microgravity.
3. Beware of typographical errors: for example, the speed of light is 3 x 10^8 m/s (and not km/s).
4. There are also ways to improve the calligraphic formatting, as there are visible deficiencies.