Review of: "The origin of dark energy and dark matter: the galactic antigravitation"

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Potential competing interests: I have worked and published on the same subject but I have no competing interests. I simply give my personal scientific opinion on the paper.

The author proposes to explain the origin of dark energy and dark matter by introducing a new concept namely “Keplerons”. I’m not against new ideas especially when they are physically founded and supported by a robust mathematical descriptions entailing results comparable to the observations. However, the overall proposed model based on “Keplerons” has no physical basis and the mathematical description presented is not really “semi-classical” as claimed by the author. In addition, the model appears to be rather qualitative, mostly philosophical than scientific. Finally, the bibliography is poor for such an important scientific riddle.

Before advancing any new models it is worthy to carry out a deep and detailed investigation using and enhancing the presently available theoretical tools. For instance, recent studies over 193 high-quality disk galaxies have ruled out the proposed modified gravity models with a high degree of statistical accuracy (see Davi C. Rodrigues et al., Nature Astronomy, 2, August 2018, 668-672).

Regarding the Dark Energy associated to the cosmological constant : First, it is worthy to note than historically Einstein had introduced it with the purpose to obtain a static model of the Universe. However, the astronomical observations demonstrated that the universe expands and Einstein removed the cosmological constant from his model affirming that it was the “biggest error in his life”. The cosmologists have recently reintroduced it in order to explain the observed cosmic acceleration through the quantum vacuum energy density. This irremediably led to the well-known vacuum energy density problem (see R.J. Adler et al. Ann. J. Phys. 63, (1995) 620-626). Therein many efforts have been carried out in order to explain the dark energy and dark matter within the QED, QCD and GR theories showing that physical solutions might be found by enhancing further the present formalisms and opening perspectives for further developments. Consequently, addressing the puzzling observations by elaborating further the present well-established theories is of primary importance before trying to advance new models based on hypothetical entities which are not supported by the experimental evidence. Through this point of view, I think that the paper needs to be further improved by introducing more convincing scientific arguments and completing consistently the bibliography.