

Exact solutions for static and spherically symmetric ultra-compact relativistic stars in semiclassical gravity

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ABSTRACT

Astrophysical black holes may be ultra-compact relativistic stars instead of proper general-relativistic black holes. The detection of gravitational waves has revived interest in this possibility, that has been under development by a few different groups during the last decade. The theoretical status of these hypothetical objects is however uncertain. In this talk I will present some recent developments aimed at changing this situation. In particular, I will discuss: (i) how to construct an extension of the equations of stellar equilibrium in general relativity to include the semiclassical effect of quantum vacuum polarization, and (ii) that there exist exact solutions to these equations, describing static and spherically symmetric ultra-compact relativistic stars. This talk will be based on [1].

References

- [1] Raúl Carballo-Rubio, “Stellar equilibrium in semiclassical gravity” arXiv:1706.05379 (2017).