

Report on “De Sitter-Invariant Black Hole ”- Manuscript universe-2403282

In this manuscript, the authors obtain de Sitter-invariant Schwarzschild solution by using the de Sitter-invariant approach to gravitation. Then, they further explore its physical properties, and possible implications for cosmology.

I find that the manuscript is interesting but I advise the authors to make some revisions:

- 1) In **Section 5.2**, the authors consider the entropy of this black hole for different horizon. How about the total entropy, since the black hole and cosmic horizon can be regard as a thermodynamic system.
- 2) In **Section 6.1**, the authors discuss the first law of black hole thermodynamics. Please find the reference paper, and reconsider it for this de Sitter-invariant Schwarzschild black hole.

In my opinion, this paper could be published in **Universe** provided the authors address the points above.

[1] M. Urano, A. Tomimatsu and H. Saida, Mechanical First Law of Black Hole Spacetimes with Cosmological Constant and Its Application to Schwarzschild-de Sitter Spacetime, Class. Quant. Grav. 26 (2009), 105010 [arXiv:0903.4230 [gr-qc]].