Stability and Predictability of the Schwarzschild-de Sitter Black Hole in the dRGT Massive Gravity Theory

Ivan Arraut[1]*

[1]Department of Physics, Osaka University, Japan

*Email of Presenting Author: ivanarraut05@gmail.com

I analyze the Schwarzschild de-Sitter black-hole solution for the family of solutions with one-free parameter satisfying the condition $\alpha=\beta^2$. It has been found by the author and Kodama that the solution is stable. It has however a background degeneracy associated with the gauge-transformation function (T_0). The degeneracy appears in the perturbation analysis where it is impossible to constraint all the perturbation variables by using the Bianchi identity. I have found that the same degeneracy makes it impossible to predict the behavior of a test particle moving around a spherically symmetric source and additionally the conservation of the total energy cannot be satisfied in the usual sense. I then extend the analysis to the family of solutions with two-free parameters with the gauge transformation function constrained.

References:

[1] Hideo Kodama and Ivan Arraut, *"Stability of the Schwarzschild-de Sitter black hole in the dRGT massive gravity theory"*, Prog. Theor. Exp. Phys. 023E02, (2014).

[2] Ivan Arraut, *"On the Black Holes in alternative theories of gravity: The case of non-linear massive gravity "* arXiv: 1311.0732 [gr-qc].