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Ricci-Gauss-Bonnet gravity, cosmology, and nuclear astrophysics

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Ricci-Gauss-Bonnet (RGB) gravity based on a pure geometric Lagrangian that is defined by a specific dimensionless combination of the Ricci (R) and Gauss-Bonnet (G) scalars is suggested and discussed as a possible viable generalization of the General Relativity (GR). Within the Parameterized Post-Newtonian (PPN) formalism it is shown that RGB gravity has the same values of PPN parameters as in the GR. As well in RGB gravity there is no ghosts, or unstable perturbations. With no need in cosmological constant and dark matter RGB gravity well agrees with the solar system data, cosmological data, and with the spectral scalar index defined by evolution of the random metric fluctuations at the inflation stage of the primordial Universe. The physics of the gravitational field arising from RGB gravity is considered in contexts of the cosmology, black holes, supernovae stars, neutron stars, compact binary systems, galaxy rotation curves, and weak-field gravity. Finally, RGB gravity is shown to exhibit a number of interesting phenomena in each of the topics mentioned above, and it is discussed for prediction of new possible experiments.

Section

Neutrino physics and nuclear astrophysics

Primary author: Dr POKROVSKY, Yury (National Research Center "Kurchatov Institute")

Presenter: Dr POKROVSKY, Yury (National Research Center "Kurchatov Institute")

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