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Rescaled Einstein-Hilbert Gravity: Inflation and the Swampland Criteria

In this work, a class of f(R, φ) gravity models is studied which during the inflationary era, which is the large curvature regime, result to an effective inflationary Lagrangian that contains a rescaled Einstein-Hilbert term αR in the presence of a canonical minimally coupled scalar field. The dimensionless parameter α is chosen to take values in the range $0 < \alpha < 1$ and the main motivation for studying these rescaled Einstein-Hilbert f(R, φ) gravities, is the fact that the rescaled action may render an otherwise incompatible canonical scalar field theory with the Swampland criteria, to be compatible with the Swampland criteria. As it is shown, by studying a large number of inflationary potentials appearing in the 2018 Planck collaboration article for the constraints on inflation, the simultaneous compatibility with both the Planck constraints and the Swampland criteria, is achieved for some models, and the main characteristic of the models for which this is possible, is the small values that the parameter α must take.

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