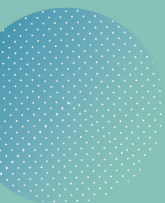




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# Physical non-viability of a wide class of $f(R)$ models and their constant-curvature solutions

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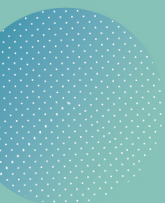
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## Abstract

Constant-curvature solutions lie at the very core of gravitational physics, with Schwarzschild and (Anti)-de Sitter being two of the most paradigmatic examples. Although such kind of solutions are very well-known in General Relativity, that is not the case for theories of gravity beyond the Einsteinian paradigm. In this article, we provide a systematic overview on  $f(R)$  models allowing for constant-curvature solutions, as well as of the constant-curvature solutions themselves. We conclude that the vast majority of these  $f(R)$  models suffer, in general, from several shortcomings rendering their viability extremely limited, when not ruled out by physical evidence. Among these deficiencies are instabilities (including previously unforeseen strong-coupling problems) and issues limiting the predictive power of the models. Furthermore, we will also show that most  $f(R)$ -exclusive constant-curvature solutions also exhibit a variety of unphysical properties.

