

Abstract Submitted
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F(R) Chameleon Models Require Fine Tuning ANDREW LUNDGREN, Syracuse University, EANNA FLANAGAN, Cornell University — Can the accelerating expansion of the universe be explained by modifying Einstein's theory? Explanations in term of the cosmological constant or some other type of dark energy tend to require very unnatural energy scales. We consider instead a modification of the equations of motion of general relativity called F(R) gravity. The Ricci scalar in the gravitational action is replaced with a function of the Ricci scalar. It is typically very difficult to modify general relativity without ruining its successes. A class of F(R) models called chameleon theories can preserve these successes while also explaining the cosmic acceleration. We show that the constraints placed by tests of gravitation require that the chameleon theories include fine-tuned parameters. These fine tunings do not rule out models of this type, but they do make them less attractive as an alternative explanation to dark energy.

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