Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Local Dynamics of Cosmological Scalar Fields YUKEI MURAKAMI, UC Berkeley / LBNL, DARIO BETTONI, Departamento de Fsica Fundamental and IUFFyM, Universidad de Salamanca, LAVINIA HEISENBERG, Institute for Theoretical Physics, ETH Zurich, TOMI KOIVISTO, Laboratory of Theoretical Physics, Institute of Physics, University of Tartu / National Institute of Chemical Physics and Biophysics, MIGUEL ZUMALACRREGUI , Max Planck Institute for Gravitational Physics / Berkeley Center for Cosmological Physics, LBNL and University of California at Berkeley — Since the discovery of accelerating expansion of the universe, there have been numerous theories that attempt to explain this surprising phenomenon. Theories of Dark Energy can be tested on cosmological scales, but also on small scales, including Solar System tests and laboratory experiments on Earth. When analyzing theories in which dark energy is produced by a scalar field, it is usual to assume that the time variation of the scalar field in the Solar System is the same as the global, cosmological value. We test this hypothesis on a simple class of disformally coupled scalar-tensor theories by numerically evolving the scalar field around a spherical matter distribution. A non-negligible disformal coupling significantly affects the relationship between the local (within the dense region) and global (asymptotically) regimes. The observed contrast in the local and global behavior suggests the need to revise usual assumptions about the evolution of scalar fields, as well as the constraints derived using those assumptions.

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Date submitted: 10 Jan 2020 Electronic form version 1.4