We gratefully acknowledge support from
the Simons Foundation
and member institutions

General Relativity and Quantum Cosmology

Equation of State for Dark Energy in Modified Gravity Theories

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(Submitted on 20 Feb 2012)

We explore the equation of state (EoS) for dark energy w_{DE} in modified gravitational theories to explain the current accelerated expansion of the universe. We explicitly demonstrate that the future crossings of the phantom divide line of $w_{\mathrm{DE}}=-1$ are the generic feature in the existing viable $f(R)$ gravity models. Furthermore, we show that the crossing of the phantom divide can be realized in the combined $f(T)$ theory constructed with the exponential and logarithmic terms. In addition, we investigate the effective EoS for the universe when the finite-time future singularities occur in non-local gravity.

Comments: 7 pages, no figure, contribution to KMI Inauguration Conference "Quest for the Origin of Particles and the Universe" (KMIIN), 24-26 Nov. 2011, KMI, Nagoya University

Subjects: **General Relativity and Quantum Cosmology (gr-qc)**; Cosmology and Extragalactic Astrophysics (astro-ph.CO)

Cite as: **arXiv:1202.4317** **[gr-qc]**

(or **arXiv:1202.4317v1** **[gr-qc]** for this version)

Submission history

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