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Scalar field description of a parametric model of dark energy

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We investigate theoretical and observational aspects of a time-dependent parameterization for the dark energy equation of state (EoS) $w(z)$, which is a well behaved function of the redshift z over the entire cosmological evolution, i.e., $z \in [-1,\infty)$. By using a theoretical algorithm of constructing the quintessence potential directly from the effective EoS parameter, we derive and discuss the general features of the resulting potential for this $w(z)$ function. Since the parameterization here discussed allows us to divide the parametric plane in defined regions associated to distinct classes of dark energy models, we use the most recent observations from type Ia supernovae, baryon acoustic oscillation peak and Cosmic Microwave Background shift parameter to check which class is observationally prefered. We show that the largest portion of the confidence contours lies into the region corresponding to a possible crossing of the so-called phanton divide line at some point of the cosmic evolution.

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