



Contribution ID: 60

Type: Oral presentation

Contributory: Quintom dark energy: Future attractor and phantom crossing in light of DESI DR2 observations

Friday, 20 November 2026 12:30 (15 minutes)

We study the late-time cosmological dynamics of a two-field dark-energy model consisting of a canonical quintessence scalar field and a phantom scalar field in a spatially flat Friedmann-Lemaître-Robertson-Walker universe. The fields are minimally coupled to gravity and uncoupled at the level of the potential, with the quintessence sector governed by an exponential potential and the phantom sector by an inverse power-law potential. By reformulating the background equations as a five-dimensional autonomous dynamical system, we identify and analyze the fixed points and their stability properties, revealing stable late-time attractors corresponding to phantom-dominated accelerated expansion. We confront the model with observations through a Bayesian parameter estimation performed using the cobaya framework, employing several combinations of recent cosmological datasets, including Pantheon+ supernovae, compressed cosmic microwave background distance priors, DESI DR2 baryon acoustic oscillation measurements, and DES year-5 supernova data. The observational constraints favor a dynamical dark-energy sector moderately and are consistent with deviations from a cosmological constant at the present epoch. The regions of parameter space preferred by the data are compatible with the stable accelerating solutions identified in the dynamical analysis, establishing a direct connection between phase-space stability and observational viability. A notable feature of the model is that the effective dark-energy equation of state undergoes phantom divide crossing in a gradual and asymptotic manner, rather than as a sharp transition.

Primary author: THANANKULLAPHONG, Phusuda (Centre for Theoretical Physics and Natural Philosophy, Mahidol University)

Presenter: THANANKULLAPHONG, Phusuda (Centre for Theoretical Physics and Natural Philosophy, Mahidol University)