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Flash talk: Phantom divide crossing with interacting scalar fields

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The accelerated expansion of the Universe poses a serious challenge to our understanding about the dark sector, motivating the investigation of dark matter and dark energy within a unified framework. In this work, we deal with the analysis of two-interacting scalar field model inspired by the hybrid inflation potential. We initially perform the cosmographic reconstruction of the Hubble parameter utilising a modified parametrisation which is constrained by the Bayesian Markov Chain Monte Carlo (MCMC) method. The cosmographic parameters are estimated using the Observational Hubble Data, Baryon Acoustic Oscillation, Type Ia Supernovae, Cosmic Microwave Background, Cosmic Chronometers and Dark Energy Spectroscopic Instrument data. The reconstructed Hubble parameter is used as an input to numerically solve the coupled scalar field equations, analysing the evolution of the interacting scalar fields. The reconstructed scalar field dynamics are then utilised to explore the dark energy equation of state. Further, the evolution of deceleration, jerk and snap parameters are also studied to understand the cosmological aspects of the model. This work demonstrates a cosmographic approach in connecting the observational constraints with interacting scalar field dynamics, paving a way for understanding the unified dark energy models.

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