



Contribution ID: 33

Type: Poster

Dynamical Dark Energy parametrizations with the KiDS-1000 Observations

Saturday 1 November 2025 11:45 (1 hour)

Recent results from the Dark Energy Spectroscopic Instrument (DESI) collaboration, based on Baryon Acoustic Oscillation (BAO) measurements, have provided intriguing evidence in favor of dynamical dark energy. In particular, DESI has released a dedicated analysis of dark energy parameterizations by combining their BAO DR2 observations with the Planck 2018 cosmic microwave background data and Type Ia supernovae constraints. Motivated by these developments, it is of considerable interest to further examine dynamical dark energy models using complementary low-redshift probes, especially weak gravitational lensing measurements from large-scale surveys such as KiDS-1000 and DES. In this work, we explore the dynamics of dark energy through three widely studied time-dependent parametrizations: the Chevallier–Polarski–Linder (CPL), Barboza–Alcaniz (BA), and Jassal–Bagla–Padmanabhan (JBP) models, using KiDS-1000 observations. Our analysis yields the following constraints on the dark energy equation of state parameters: for CPL, $w_0 = -0.93 - 0.17 + 0.59$, $w_a = -0.60 - 0.68 + 0.92$; for BA, $w_0 = -0.91 - 0.46 + 0.72$, $w_a = -1.6 - 1.4 + 1.2$; and for JBP, $w_0 = -1.19 \pm 0.59$, $w_a = -0.10 \pm 1.5$. Notably, the CPL parametrization shows consistency with DESI’s findings. We also obtain constraints on the clustering amplitude parameter S_8 : for CPL, $S_8 = 0.76 \pm 0.53$; for BA, $S_8 = 0.73 \pm 0.38$; and for JBP, $S_8 = 0.744 - 0.061 + 0.051$. These results are consistent with the KiDS-1000 weak lensing measurements but remain in significant tension with the Planck 2018 constraint, $S_8 = 0.832 \pm 0.013$. Our findings thus add the evidence supporting a possible departure from the cosmological constant and motivate continued investigation of evolving dark energy scenarios with upcoming high-precision cosmological data.

Author: Mr KUMAR, Dharmendra (Malaviya National Institute Of Technology Jaipur)

Presenter: Mr KUMAR, Dharmendra (Malaviya National Institute Of Technology Jaipur)

Session Classification: Poster Presentations

Track Classification: Track 01: High Energy Physics, Gravitation and Cosmology