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## Constraining the dark energy-dark matter interaction model using low-redshift observations

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Various observations have shown that dark energy accounts for nearly two-thirds of the energy density of the Universe.

The simplest model to explain the nature of dark energy is the cosmological constant ( $\Lambda$ CDM) model. Although Planck observations supports using  $\Lambda$ CDM model as the base cosmological model, there exist some inconsistencies in parameter estimates when compared with independent observations.

The most important is the inconsistency in the  $H_0$  estimates from the Planck collaboration which reports  $H_0=67.5^{+0.5}_{-0.5}$  km s<sup>-1</sup> Mpc<sup>-1</sup>, a considerably lower value when compared with the direct local distance ladder measurements. This value shows a discrepancy at the level

greater than  $4\sigma$  with the constraints reported by SH0ES collaboration in 2019,  $H_0=74.3^{+1.42}_{-1.42}$  km s<sup>-1</sup> Mpc<sup>-1</sup>. These disagreements, called the Hubble tension, point towards a new physics that deviates from the standard  $\Lambda$ CDM model and to resolve this various methods have been proposed.

In this talk, we focus on an interacting dark energy dark matter model where the interacting term is taken to be linear in the field ( $\phi$ ) and a quintessence scalar field with an inverse power potential ( $V(\phi) \sim \phi^{-n}$ ) is assumed as a description of dark energy. We study in detail the evolution of the model and provide constraints on the model parameters using low redshift cosmological observations of Type Ia Supernovae (SN), baryon acoustic oscillations (BAO), direct measurements of Hubble parameter (Hz) and high redshift HII galaxy measurements (HIIG). We find that the model agrees with the existing values of the nonrelativistic matter density parameter,  $\Omega_m$  and dark energy equation of state parameter,  $w_0$ . The analysis shows that the interacting model prefers a negative value of coupling constant and gives the best fit value of  $H_0=69.9^{+0.46}_{-1.02}$  km s<sup>-1</sup> Mpc<sup>-1</sup> and thereby alleviates the  $H_0$  tension between Planck measurements and the observations considered. [arxiv: 2102.12367].

**Primary author:** SANGWAN, Archana (Indian Institute of Technology)

**Co-authors:** Mr JOHNSON, Joseph P. (Indian Institute of Technology Bombay); Prof. S., Shankaranarayanan (Indian Institute of Technology Bombay)

**Presenter:** SANGWAN, Archana (Indian Institute of Technology)

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