Contribution ID: **452** Type: **Talk in the parallel session**

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

Tuesday, 6 July 2021 11:50 (20 minutes)

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 (ΛCDM) model. Although Planck observations supports using ΛCDM 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^{-1} Mpc^{-1}, a considerably lower value when compared with the direct local distance ladder measurements. This value shows a discrepancy at the level
greater than 4σ with the constraints reported by SH0ES collaboration in 2019, H_0=74.3$^{+1.42}_{-1.42}$ km s^{-1} Mpc^{-1}. These disagreements, called the Hubble tension, point towards a new physics that deviates from the standard ΛCDM 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 (ϕ) 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, Ω_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^{-1} Mpc^{-1} 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)

Session Classification: Dark Energy and the Accelerating Universe

Track Classification: Dark Energy and Large Scale Structure: Dark Energy and the accelerating universe