



Contribution ID: 381

Type: **Talk in a parallel session**

Luminosity distance dispersion in Swiss-cheese cosmology as a function of the hole size distribution

Thursday, 11 July 2024 17:45 (15 minutes)

The luminosity distance-redshift (D_L - z) relation of Type Ia supernovae (SNe Ia) yields evidence for a nonzero cosmological constant, i.e. ‘dark energy’. SNe Ia analyses typically involve fitting the D_L and z to the functional form derived theoretically from the homogeneous and isotropic Friedmann-Lemaître-Robertson-Walker (FLRW) metric. However, the metric in the epoch relevant to SNIa measurements deviates appreciably from FLRW due to gravitational clumping of mass into large-scale structures like filaments and voids, whose size distribution spans many orders-of-magnitude. Each line of sight to a SNe Ia passes through a random sequence of structures, so D_L differs stochastically from one line of sight to the next. Such dispersion in D_L may be dominated by a few large voids or many small voids, partly depending on the probability density function of the void size. In this work, we calculate the D_L dispersion in a Lemaitre-Tolman-Bondi Swiss-cheese universe with a power-law hole size distribution, as a function of the lower cut-off and logarithmic slope.

Primary authors: CHEUNCHITRA, Thippayawis; Prof. MELATOS, Andrew (University of Melbourne)

Presenter: CHEUNCHITRA, Thippayawis

Session Classification: Dark energy and the accelerating universe

Track Classification: Dark Energy and Large Scale Structure (DE): Large scale structure and dark energy