

The Cepheid Distance Scale and its Metallicity Dependence

Saturday, 10 September 2022 09:50 (20 minutes)

Cepheid variables are the best calibrated primary standard candles they are used to standardize the brightness of Type Ia supernovae (SNIa) in nearby galaxies and therefore are central in the determination of the local value of the Hubble constant (H_0). The empirical measurement of the Hubble constant obtained by the SH0ES team from the Cepheid-SNIa method is now in 5-sigma tension with the Planck prediction based on the Λ -CDM model. While both estimates have reached a great precision, the source of the Hubble tension remains unknown and suggests evidence of new physics beyond the standard model. In this talk I will describe recent progress on the Cepheid distance scale involving Gaia parallaxes and HST photometry and I will identify the remaining issues and systematics associated with the calibration of their period-luminosity relation. In particular, differences in Cepheid metallicities between the Milky Way, Magellanic Clouds and nearby galaxies hosting SNIa must be corrected in order to provide a consistent distance calibration. Finally I will discuss how future missions and promising techniques are expected to improve again the precision of the empirical H_0 value.

Presenter: Dr BREUVAL, Louise (Johns Hopkins University)