

The extragalactic distance scale from near infrared observations of Type II Cepheids in the Magellanic Clouds

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Type II Cepheids(T2Cs) are the less used counterparts of classical Cepheids(CCs), which provide the primary calibration of the distance ladder for measuring H_0 in the local Universe. In the era of the 'Hubble tension', T2Cs together with the RR Lyrae stars and the tip of the red giant branch(TRGB) can potentially provide non-CC-dependent calibration of the cosmic distance ladder.

Our goal is to provide an absolute calibration of the period-luminosity and period-Wesenheit relations(PL and PW) of T2Cs in the Large Magellanic Cloud(LMC), which serves as anchor of the extragalactic distance ladder.

We exploited time-series photometry in the near-infrared(NIR) YJK bands for 320 T2Cs in the Magellanic Clouds. These observations were acquired in the context of the VISTA survey of the Magellanic Clouds system, an ESO public survey. We used the best-quality NIR light curves to generate templates for modelling sparsely sampled light curves.

The template light curves were used to derive accurate and precise intensity-averaged mean magnitudes and pulsation amplitudes. We used optical and NIR mean magnitudes for different T2C subclasses to derive PL/PW relations in multiple bands, then calibrated with the geometric distance to the LMC and with the Gaia parallaxes.

We used our new empirical calibrations of PL-PW relations to obtain distances to 22 T2C-host Galactic globular clusters, which were found to be systematically smaller by 0.1 mag and 0.03-0.06 mag than in the literature. Better agreement is found between our distances and those based on RR Lyrae stars, providing support for using T2Cs for future distance scale studies.

sessioni congresso

Stelle, popolazioni stellari e mezzo interstellare

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