

Are the Ultra Long Period Cepheids cosmological standard candles?

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RESULTS AND ACTIVITIES SUPPORTED BY THIS GRANT

These objects represent a challenge both from observational and theoretical point of view. They should represent “best standard candles” directly observable $>100\text{Mpc}$, thus reducing the systematic errors in the H_0 determination

In the first year:

- We have collected all the data in archives (Gaia DR3) and literature and used proprietary data to improve the statistics and the accuracy of the known ULPs
- We have performed simulations to get information about the recovery of ULP pulsation properties (light curves, periods, mean magnitudes and colors) in the Rubin-LSST survey that will offer a unique opportunity to give a fundamental contribution to this topic
- 6 travels
- 2 visiting researchers at INAF-OACN to collaborate on stellar pulsation modeling of Cepheid and RR Lyrae stars.
- 7 contributions to international meetings and 1 to a national meeting
- 1 paper almost ready

In progress (theory and observations):

- We are searching for Galactic ULPs in the Gaia DR3 database (none are known so far)
- Extension of pulsation models to highest luminosities and mass to cover ULP ranges
- 1 paper in preparation
- 1 laptop

Pro: This grant has been fundamental to participate to several meetings and give visibility to this innovative topic

Cons: Time elapsed to have the funds available