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Pulsating stars as stellar population tracers from OGLE, VISTA, VVV, Gaia and VST data

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"Thanks to their variability and characteristic oscillation properties, pulsating stars such as Cepheids and RR Lyrae are traditionally used not only as distance indicators but also as stellar population tracers.
From the comparison between the observed pulsation properties and their theoretical counterparts based on nonlinear convective pulsation models we are able to constrain the intrinsic stellar properties of the investigated variables. Theoretical period-age and period-age-color relations for Cepheids allow us to reconstruct the star formation history of the Magellanic Clouds when applied to OGLE IV and VMC@VISTA Cepheid data. On the other hand the predicted dependence of the RR Lyrae pulsation properties on the helium abundance allows us to constrain the helium content of Bulge RR Lyrae as observed by the OGLE IV and the VVV survey. The model fitting of observed Cepheid and RR Lyrae light curves both from the OGLE III/IV and VMC@VISTA data provides sound constraints on all the intrinsic stellar parameters and confirms dynamical extimates of stellar masses. The same technique is being applied to Cepheids and RR Lyrae with Gaia parallaxes.
Finally in the context of the STREGA@VST survey we plan to use RR Lyrae as tracers of possible stellar overdensities around the globular cluster Pal 3 and/or the dwarf spheroidal galaxies Fornax and Sculptor, as signatures of interactions with the Galactic Halo.
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