

Exploring the Frontiers of Stellar Astrophysics with classical Cepheids: Rotation, Convection, Mass Loss and Multiplicity

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ABSTRACT: The past decade has seen tremendous advances in astronomy with the discovery of thousands of extrasolar planets, new measurements of cosmological parameters, and new, detailed observations of the properties and evolution of stars. These observations are challenging our understanding of stellar physics and are motivating the need for new models and theories as we enter an era of precision stellar astrophysics. One such niche for testing stellar astrophysics is classical Cepheids. These are evolved, intermediate-mass, pulsating variable stars that have helped form the foundations of both cosmology and stellar astrophysics over the past century, yet are still powerful laboratories for stellar astrophysics. Thanks to their pulsation and recent observations, I will discuss how we can use classical Cepheids to probe the physics of stellar rotation, convection, stellar winds, and binary star interactions using state-of-the-art stellar evolution and atmosphere models. These modelling tools are not specific to Cepheids and can be applied to a variety of types of stars, such as planet-hosting stars. I will discuss new results showing how we can use model stellar atmospheres to refine planetary transit measurements to better understand both stellar and extrasolar planetary properties.

ALL ARE WELCOME!