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Gleaning the interiors of ultra-hot Jupiters from phase curve observations

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Planets orbiting close to their stars are strongly influenced by stellar tidal forces which deform the shape of the planet. Measuring the deformed shape of such exoplanets allows to better constrain planetary properties such as their true radii and densities. Furthermore, measuring deformation can reveal crucial information about the interior structure of such planets since the degree of deformation is related to the interior differentiation that is parameterized by the second-degree fluid Love number. Phase curves of transiting planets provide a unique opportunity to measure the planetary deformation from precise light curves. In this talk, I will present the phase curve model of deformed planets that allows estimating the Love number of the planet with improved precision. I will further present an application of this model to real observations of WASP-12b. Finally, I will show how the photometric precision expected from PLATO can help in better constraining the Love number and the implications for interior structure models.

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