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## PLATO's photometric retrieval of the tidal deformation of cool stars

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The PLAnetary Transits and Oscillations of stars (PLATO) telescope is going to study a large number of extra-solar planetary systems. Given the design of the mission, PLATO will produce long-duration uninterrupted high precision photometry of a significant number of host stars and as a result, PLATO is best suited for phase curve studies of transiting exoplanets. We present a scientific motivation for the observation of short-period, massive transiting exoplanets to better characterization of the host star. The shape and motion of the host star is significantly affected by its planetary companion. The effect becomes larger as the planet to star mass ratio increases. The phase curve of a short-period hot-Neptune or a hot-Jupiter provides information on the tidal shape and orientation of the host star, in addition to its rotational velocity. In this context, we predict the performance of PLATO over such systems with particular focus on the detection of ellipsoidal variations. We studied such systems and computed the signal to noise of the resultant gravity darkening parameter that provides information on the tidal deformation of the star. The study of ellipsoidal variations is going to shine more light on the current stellar models with the need for a refinement on the stellar parameters with spherically asymmetric models.

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