

Plaskett's Star: Analysis of the CoRoT photometric data

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Context. The second short run (SRa02) of the CoRoT space mission for Asteroseismology was partly devoted to stars belonging to the Mon OB2 association. An intense monitoring has been performed on Plaskett's Star (HD47129) and the unprecedented quality of the light curve allows us to shed new light on this very massive, non-eclipsing binary system.

Aims. We particularly aimed at detecting periodic variability which might be associated with pulsations or interactions between both components. We also searched for variations related to the orbital cycle which could help to constrain the inclination and the morphology of the binary system.

Methods. An iterative Fourier-based prewhitening and a multiperiodic fitting procedure have been applied to analyse the time series and extract the frequencies of variations from the CoRoT light curve. We describe the noise properties to tentatively define an appropriate significance criterion and, in consequence, to only point out the peaks at a certain significance level. We also detect the variations related to the orbital motion and study them by using the NIGHTFALL program.

Results. The periodogram computed from Plaskett's Star CoRoT light curve mainly exhibits a majority of peaks at low frequencies. Among these peaks, we highlight a list of about 43 values, including notably two different sets of harmonic frequencies whose fundamental peaks are located at about 0.07 and 0.82 d^{-1} . The former represents the orbital frequency of the binary system whilst the latter could probably be associated with non-radial pulsations. The study of the 0.07 d^{-1} variations reveals the presence of a hot spot most probably situated on the primary star and facing the secondary.

Conclusions. The investigation of this unique dataset constitutes a further step in the understanding of Plaskett's Star. These results provide a first basis for future seismic modelling and put forward the probable existence of non-radial pulsations in Plaskett's Star. Moreover, the fit of the orbital variations confirms the problem, already mentioned in previous works, of the distance of this system. The existence of a hot region between both components renders the determination of the inclination ambiguous.

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