

INVESTIGATION OF THE CIRCUMBINARY PLANET IN A POLAR CV DP LEO

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In this work, we report the long-term photometric observations of DP Leo spanning an additional seven years and adopts the data obtained from the previous literature to investigate the presence of the circumbinary planet around DP Leo. The photometric observation of DP Leo was obtained in 2014-2020 using the 2.4m Thai National Telescope with ULTRASPEC instrument in g' , r' , and KG5 filters. Aperture photometry is performed using the HiPERCAM pipeline. From our investigation, the light curve of DP Leo contains the white dwarf, the red dwarf, the spot, and the stream. The stream in the light curves is assumed as a very small contribution. The composite model is constructed to derive the model of all and white dwarf contributions using lcurve software with lroche package. The light curve fitting is optimized using the Levenberg-Marquardt algorithm. The Sigmoid function is used to derive the mid-eclipse time of the white dwarf and all contributions. The observed time subtracted by the calculated time (O-C diagram) analysis has been performed to study the time variation in the binary stars system using the ephemeris of the mid-eclipse times (T_0) and the accurate orbital period (P_{orb}). The orbital period change can be seen in the result as cyclic change in the O-C diagram. Light Travel Time (LTT) effect is applied to the O-C analysis. The preliminary result of light curve fitting, the O-C analysis, and the presence of the circumbinary planet in DP Leo will be discussed.