



LIGHT CURVE MODELLING AND ANALYSIS OF THE ECLIPSING BINARY STAR ASAS 111307 – 0005.6

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Abstract

Binary star systems have long been recognized as useful astrophysical laboratories for probing stellar structure and evolution in a broad range of masses, evolutionary stages, and chemical composition. They are also useful in determining cosmic distance and time without external calibration. In this paper, we present a detailed light curve analysis of the publicly available V-band observations of the eclipsing binary star ASAS 111307-0005.6, obtained by the All Sky Automated Survey (ASAS)-3 project between November, 2000 and July, 2009. From the modeling and analysis, it is established that this is an Algol-type eclipsing system comprising a main sequence star and a much cooler evolved companion star that is in contact with its inner critical surface. We also established that the system has a mass ratio of about 0.5, a period of 0.6194 ± 0.0451 days. With this period, the linear ephemeris equation for ASAS 111307-0005.6 is determined to be:

$$\text{Min } I(\text{Hel.}) = 2451871.9 + 0.0.6194E \pm 0.0451.$$

The effective temperature of the system is in the range, 5200K – 5650K, thus making it a K0 - G6 stellar system. The orbital plane of the system is inclined at about 80° to the line of sight. We could not establish the presence of third light or spot, but the modelling indicates the likely presence of a disc on the primary component with a latitude cut-off of about 20° .

Keywords and phrases: Algol-type binary, ASAS 111307-0005.6, light curve, linear ephemeris.

