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**NSV 15852 IS LIKELY AN ELLIPTICAL VARIABLE AKIN
IN TYPE TO AO Cas**

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NSV 15852 = BD +56 864 = LS I +57 139 = GSC 03725-00498 was noted as being variable in the ultraviolet by the ANS catalogue of UV point sources (Wesselius et al., 1982). It seems in fact to be a member of the rare ELL/KE type, with a 1.175 ± 0.004 day period, and similar in nature to AO Cas, according to Northern Sky Variability Survey (NSVS) data (Wozniak et al., 2004).

The amplitude is about 0.3 instrumental magnitudes (NSVS Documentation suggests that ROTSE-I magnitudes are from a CCD chip with a spectral response similar to Johnson R that is filter cropped at the extrema of 450 and 1000 nm). Figure 1 shows the symmetry and cleanly sinusoidal nature of the light curve, as per the definition of elliptical variables, which compares favourably with that of AO Cas (see for example figure 1 of Hiltner, 1949) as opposed to the “concertina” like alternation in minima and maxima width that is displayed by an eclipsing star of type EW.

The spectral type of O6nn (Morgan, Code and Whitford, 1955) also compares directly to AO Cas in terms of the KE subtype. The spectral suffix ‘nn’ refers to the very nebulous appearance of the spectral lines within the spectrum, and considering that the orbital period is not particularly rapid, suggests that either atmospheric macroturbulence and/or gas stream action may be involved (note that ‘nebulous appearance’ in terms of spectral lines is in fact describing the morphological appearance of said lines, and in no way implies any nebulosity being involved with a star). In this case the object could be represented by a Roche lobe filling O6 star orbiting a smaller star of mass ratio 0.2.

However, Negueruela and Marco (2003) note from their observations that this O6nn type could merely be apparent, being a consequence of the dispersion used, and find it more likely that the lines are double and that the object could be a pair of O6V((f)) stars, in which instance they could be in a heavy over-contact configuration, and the light curve could then represent the combined ellipsoidal variability of both components (making the reasonable assumption of a fully synchronous system).

This latter possibility, given the paucity of known O type binaries suitable for mass and radius determination, would make the object of interest. It is presented in this light, as a candidate for further study, most likely of the radial velocity curve.

The 2MASS $J - K_s$ value of 0.05 is appropriate for a reddened star of this type, and this in tandem with the lack of any source in either the IRAS or MSX6C catalogues points

towards there being no infrared excess as could be expected from any appreciable amount of circumstellar matter.

The NSV supplement (Kazarovets, Durlevich and Samus, 1998) quoted V magnitude of 9.68, when corrected for the $E(B-V)$ of 0.6 (Savage et al., 1985), gives a distance range of approximately 3.5 to 5.5 kpc dependent on whether the star is a dwarf or a giant (there is also uncertainty due to there being no evidence as to the companion's contribution to the total luminosity). This is appropriate if the star is part of Camelopardalis OB3 in the Cygnus or Outer Arm (Negueruela and Marco, 2003), as is likely also the case for the roughly adjacent HII nebulosity and star forming region S204.

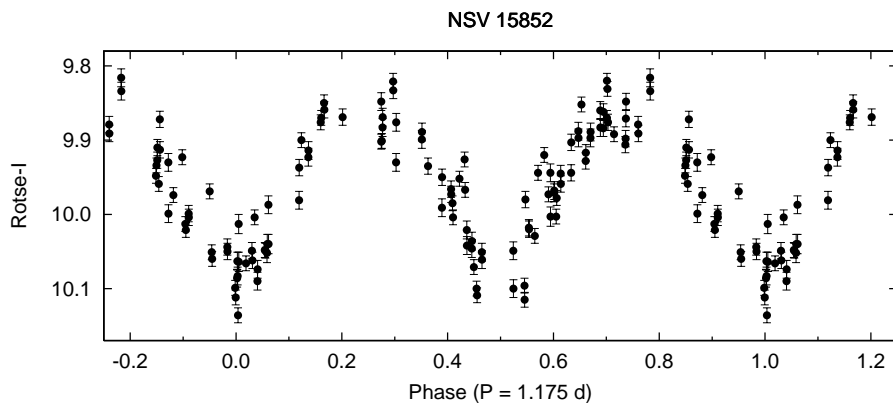


Figure 1. Phase diagram of NSVS ROTSE-I magnitude data for NSV 15852 folded on a 1.175 day period.

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