

## NSV 02541, A DETACHED ECLIPSING BINARY STAR IN ORION

The variability of NSV 02541 (HD 290807, GSC 4767.0483, SVS 1007, CSV 000650) was first reported by Parenago (1946). In the NSV catalogue (Kholopov, 1982), this object is recorded as an eclipsing binary star without specifying type, with a photographic variation range from  $11^m.1$  to  $12^m.0$  and spectral type G5.

NSV 02541 was observed for 26 nights in the V band, from 9 October 1995 to 24 February 1996 from Mollet Observatory (Spain), using a CCD camera and a 0.4-m telescope. GSC 4767.1182 and GSC 4767.0335 were used, respectively, as comparison and check stars. To determine the magnitude and B–V color index of NSV 02541 and its comparison star, these objects were also observed in the B and V bands using a photoelectric photometer attached to the Cassegrain focus of the 0.6-m telescope at Esteve Duran Observatory. As comparison stars HR 1940, HR 1952, and HR 1955 were used.

Observations showed that NSV 02541 is, in fact, a detached eclipsing binary star with a period over 4.6 days (Figure 1). This object has a V magnitude of  $10.64 \pm 0.02$  at maximum light. The amplitude, also in V, is  $0^m.97 \pm 0^m.02$  for minimum I and  $0^m.14 \pm 0^m.02$  for minimum II. Phase curve suggests that the primary minimum, with a duration of  $21.5 \pm 2$  hours, is an annular transit. It also shows that minimum II is centered at phase 0.51, which indicates eccentric orbits for the components. Nevertheless, the long duration of eclipses and continuous bad weather conditions during the observation period did not allow to confirm these preliminary results.

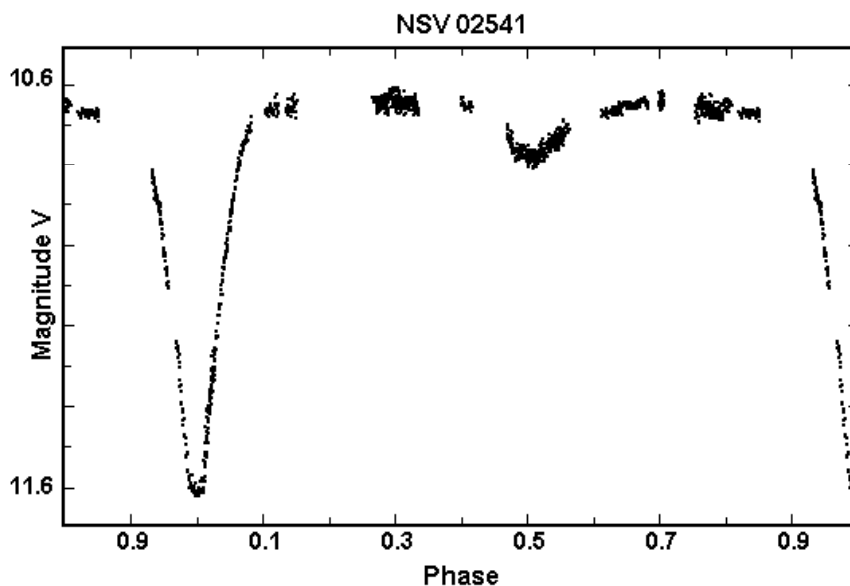


Figure 1

To check possible B–V color index variations, observations in the B and V bands were also performed for 6 nights, from October 1996 to January 1997, which sampled the light curve at the primary and secondary minima and at maximum light. These observations indicate that the B–V color index has a value of  $0^m87 \pm 0^m03$ , with no detectable variations beyond data scatter.

The following ephemeris was also derived:

$$\begin{aligned} \text{Min. I} = & \text{HJD } 2450073.5185 + 4^d63404 \times E \\ & \pm 0.0009 \pm 0.00015 \end{aligned}$$

Although observations are not good enough to fit an accurate physical model for the binary system, they allowed to estimate the relative dimensions and luminosities of both components. These estimates indicate that the secondary star might be a K5 object of smaller size than the primary component. New spectroscopic and more photometric data are needed to clarify the exact nature of this system.

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#### References:

- Kholopov, P.N., 1982, New Catalogue of Suspected Variable Stars, Moscow  
 Parenago, P.P., 1946, *PZ*, **6**, 26