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**NSV 25610: A HIGH-AMPLITUDE  $\delta$  SCUTI STAR**

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NSV 25610 (= HD 204615 = BD+46°3325;  $\alpha_{2000} = 21^{\text{h}}28^{\text{m}}24^{\text{s}}.56$ ;  $\delta_{2000} = +46^{\circ}40'30''.8$ ) was suspected of variability by Yoss et al. (1991). They derived a distance of 215 parsec, an absolute magnitude  $M_v = 2.2$ , and a total space velocity  $S = 32$  with components  $U = 5$ ,  $V = 31$  and  $W = -2$  (in  $km/s$ ). They also determined  $V = 8.86$  and  $(B - V) = +0.27$  mag, which classifies this star as of spectral type F2. Piquard (2001) analysed the available Tycho data (Høg et al., 2000), and suggested it is a SX Phe variable star with a period of 0.094206 days.

This variable star was monitored on five nights in September and October 2003 at Beersel Hills Observatory (BHO) with a 40-cm telescope equipped with an ST10 XME camera (during three nights) and a 13-cm refractor with an ST7E camera (during two nights), using  $B$  and  $V$  filters. The total observation time was 28 hours, resulting in 622  $V$  and 151  $B$  data points. The frames were reduced with the aperture photometry procedure of the Mira AP software package.<sup>†</sup> The brightness of the variable was measured with respect to 10 stars in the immediate vicinity (with  $V$  and  $B - V$  ranging from 8.2 to 10.6 mag and from 0.0 to 1.4 mag respectively). The magnitudes were then transformed to standard Johnson  $B&V$  magnitudes using the  $V$  and  $B - V$  values from the Tycho catalogue (ESA, 1997). Standard deviations on the comparison stars data ranged between 0<sup>m</sup>.005 and 0<sup>m</sup>.016 mag.

Our data confirm that NSV 25610 is a high amplitude  $\delta$  Scuti star (HADS), with the period given by Piquard (2001). The  $V$  magnitude varied between 8.53 and 8.97 mag, while the  $B$  magnitude varied between 8.82 and 9.38 mag. Due to its location near the galactic plane ( $b = -3^{\circ}.13$ ) and its low space velocity, the star is most likely a Population I star, and not a SX Phe variable star. The following improved ephemeris could be derived:

$$\text{Max.} = \text{HJD } 2452885.3992 + 0^{\text{d}}.0942075 \times E \\ \pm 0.0001 \pm 0.0000003$$

The list of observed maxima, is given in Table 1.  $O - C$  values are given with respect to the above ephemeris. A phase plot is shown in Fig. 1. Using Period98 (Sperl, 1998), the Fourier parameters presented in Table 2 were derived. These can be directly compared to those of other  $\delta$  Scuti stars (Morgan, 2003). However, Fourier terms cannot aid to discriminate between these two stellar populations (Poretti, 2002).

<sup>†</sup>The Mira AP software is produced by Axiom Research Inc.

Table 1. Observed times of maximum.

HJD	E	$O - C$	Filter
2452885.3991	0	-0.0001	V
2452885.3993	0	0.0001	B
2452887.3777	21	0.0001	B
2452887.3778	21	0.0002	V
2452887.4720	22	0.0002	V
2452887.4720	22	0.0002	B
2452887.5656	23	-0.0003	V
2452887.5658	23	-0.0002	B
2452887.6599	24	-0.0002	V
2452928.2634	455	-0.0002	V
2452928.3582	456	0.0004	V
2452928.4520	457	-0.0001	V
2452928.5465	458	0.0003	V
2452929.2996	466	-0.0002	V
2452929.3940	467	-0.0001	V
2452929.4885	468	0.0002	V
2452929.5823	469	-0.0002	V
2452931.4667	489	0.0000	V

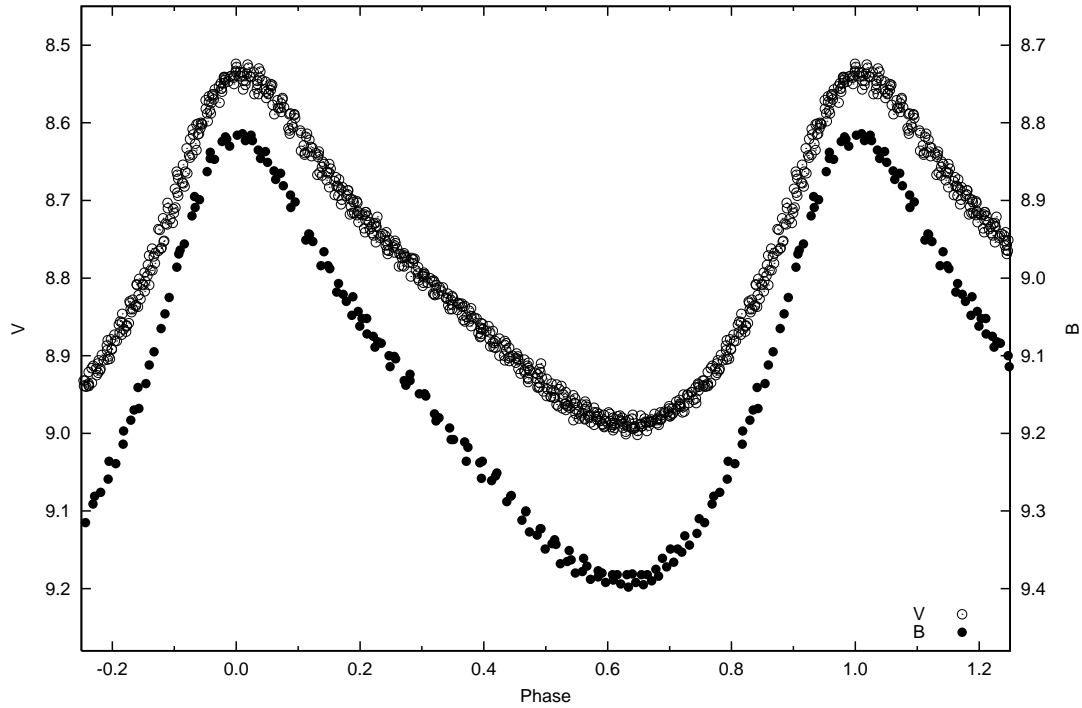


Figure 1. Phased B and V light curves of NSV 25610.

Table 2. Fourier parameters for the  $B$  and  $V$  data.

Parameter	$B$	$V$
$A_0$	9.15	8.80
$R_{21}$	0.269	0.276
$R_{31}$	0.095	0.099
$R_{41}$	0.039	0.043
$\Phi_{21}$	4.17	4.20
$\Phi_{31}$	1.48	1.51
$\Phi_{41}$	5.30	5.37

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