

COMMISSION 27 OF THE I. A. U.  
INFORMATION BULLETIN ON VARIABLE STARS

Number 3659

Konkoly Observatory  
Budapest  
12 September 1991  
HU ISSN 0374 - 0676

LSS1160 (=CD-44°4834) : A REDDENED  $\beta$  LYRAE SYSTEM

A programme is currently nearing completion at the South African Astronomical Observatory (SAAO) to obtain photoelectric photometry (uvby $\beta$ /VRI/JHK) for the 'reddened' and 'extremely reddened' stars from the "Luminous Stars in the Southern Milky Way" Catalogue (Stephenson & Sanduleak 1971). Star LSS1160 was found to be variable and was subsequently discovered to be in the New Catalogue of Suspected Variables (NSV4260, Kukarkin et al 1982) and to be a Bamberg variable star (BV1200, Strohmeier & Patterson, 1969) although the type of variability was not known. We have monitored the star in the Johnson UBV system during 1989-91 and it appears to be a  $\beta$  Lyrae type eclipsing system.

LSS1160 was observed with two other stars from the same catalogue to serve as local comparisons; LSS1172 and LSS1184 are near LSS1160 on the sky and are both reddened OB stars, though not as reddened as LSS1160. All data were reduced to the E-region system of Cousins (see Menzies et al 1989) and the mean values for the comparison stars are given in Table 1. LSS1184 shows larger standard deviations in V than the fainter star LSS1172 and the difference between the two seasons 1989-90 and 1990-91 is quite large; it is possibly variable and the V magnitude values were not used to correct the LSS1160 data.

A dispersion minimisation program was used to find a period  $4.2905 \pm 0.0005$  day and the corrected data are shown in Fig. 1, phased with this period. A provisional ephemeris is:

$$\text{HJD (primary min.)} = 2447866.096 + 4.2905 E$$

The continuously variable light curve, relatively long period and the early-type nature of the stars indicate the system is a  $\beta$  Lyrae type eclipsing binary.

Preliminary Strömgren photometry gives:

$(b-y) = 0.855$ ,  $m_1 = -0.195$ ,  $c_1 = 0.065$ ,  $\beta = 2.578$ ,  
however, there may remain transformation uncertainties in these

TABLE 1. UBV photometry of comparisons stars

		V	(B-V)	(U-B)	n
LSS1172	1989-90	9.436 ±0.006	0.716 ±0.004	-0.311 ±0.006(sd)	25
	1990-91	9.437 5	0.719 7	-0.311 8	28
	adopted	9.437	0.717	-0.311	
LSS1184	1989-90	7.603 10	0.743 4	-0.289 6	23
	1990-91	7.581 19	0.742 7	-0.289 6	29
	adopted	var?	0.743	-0.289	

figures (particularly in  $c_1$ ) because of the high interstellar reddening. Additionally, the  $H\beta$  index is probably not a reliable indicator of absolute magnitude because the system is known to show  $H\alpha$  emission (Münch 1955). The colours correspond to a spectral type near B0 reddened by  $E(b-y)=0.95$  ( $A_V = 4.09$ ) if the stars are main-sequence or giants (Crawford 1978). The  $H\beta$  index is consistent with a B0 III star, so given that  $H\beta$  could be affected by emission, the stars are unlikely to be more luminous than class III and could easily be less.

Low-dispersion spectroscopy (100 and 210 Å/mm) shows weak Balmer lines of hydrogen. HeI is very weak, though HeI4026 is present; HeII lines are not identified. A feature near H4101 might be SiIV4088 and there is some evidence for CIII/NIII near 4640-50Å. There is no compelling evidence for emission lines in the region 3400-5200Å but  $H\alpha$  is very weak in the 210Å/mm spectrogram and is presumably partly filled by emission. Identification of all features (except those of hydrogen) is uncertain because of the low dispersion and rotation effects, but the above

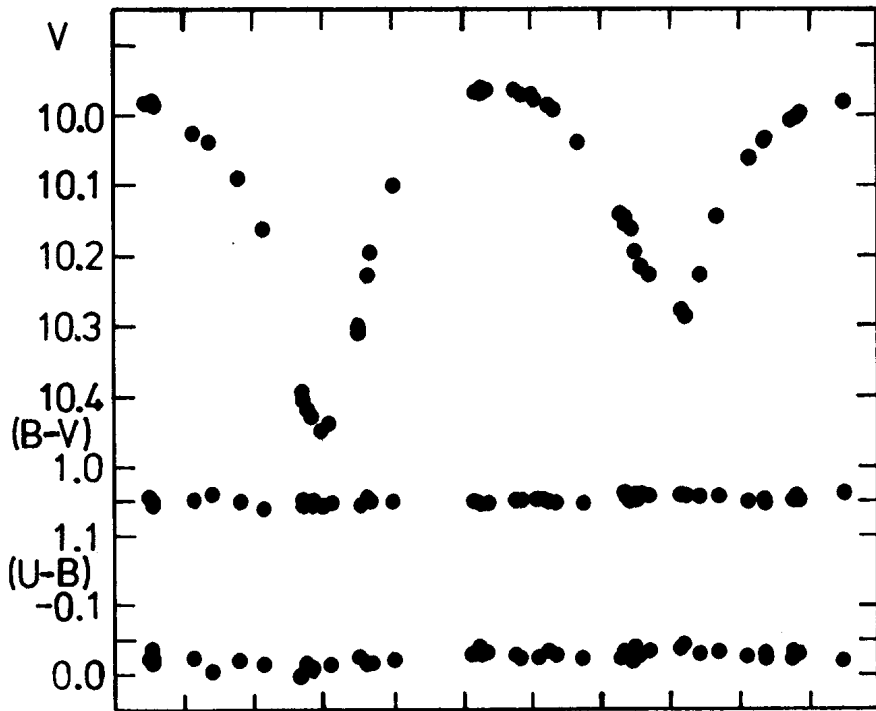


Figure 1. UB photometry for L551160 phased according to the ephemeris given in the text.

notes are consistent with a type  $\sim$ B0 as suggested by the Strömgren colours.

Assuming the primary star to have  $V=10.3$  (see Fig. 1) and a type B0, results in a distance of  $\sim 1$  kpc for class V and  $\sim 1.7$  kpc for class III. The observed reddening is then roughly consistent with the average found in Fitzgerald's region 'I' for distances greater than 1 kpc.

A programme of spectroscopy for radial velocity determination and more photometry is planned for early 1992.

D. KILKENNY, F. VAN WYK,  
F. MARANG and K. SEKIGUCHI  
S A Astronomical Observatory  
P O Box 9, Observatory 7935  
SOUTH AFRICA

#### References

- Crawford, D.L., 1978. *Astr. J.*, **83**, 48.  
Fitzgerald, M.P., 1968. *Astr. J.*, **73**, 983.  
Kukarkin, B.V. et al., 1982. *New Catalogue of Suspected Variable Stars*. Moscow.  
Menzies, J.W., Cousins, A.W.J., Banfield, R.M. & Laing, J.D., 1989. *SAAO Circulars* **13**, 1.  
Münch, L., 1955. *Bol. Obs. Tonantzintlay Tacubaya* **2**, No.13, 28.  
Stephenson, C.B. & Sanduleak, N., 1971. *Publ. Warner & Swasey Obs.* Vol 1, No.1.  
Strohmeier, W. & Patterson, I., 1969. *Inf. Bull. Var. Stars*, **330**.