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PHOTOELECTRIC OBSERVATIONS OF DR VULPECULAE

ÇİÇEK, C.

Çanakkale Onsekiz Mart University, Faculty of Arts and Sciences, Department of Physics,
TR-17100 Çanakkale, Turkey, email: canerk@bornova.ege.edu.tr

Name of the object:
DR Vul = DM +26°3835 = HD 339770

Equatorial coordinates:	**Equinox:**
R.A.= $20^{\rm h}13^{\rm m}46\overset{\rm s}{.}85$ **DEC.**= $+26°45'01\overset{''}{.}59$	2000

Observatory and telescope:
Ege University Observatory (EUO), 48-cm Cassegrain reflector; TÜBİTAK (Scientific and Technical Research Council of Turkey) National Observatory (TNO), 40-cm Cassegrain telescope

Detector:	EMI 9781 A photomultiplier tube of EUO; Hamamatsu R 4457 photomultiplier tube of TNO

Filter(s):	Johnson B and V

Comparison star(s):	BD +26°3827

Check star(s):	BD +26°3837

Transformed to a standard system:	No

Availability of the data:
Upon request

Type of variability:	EA

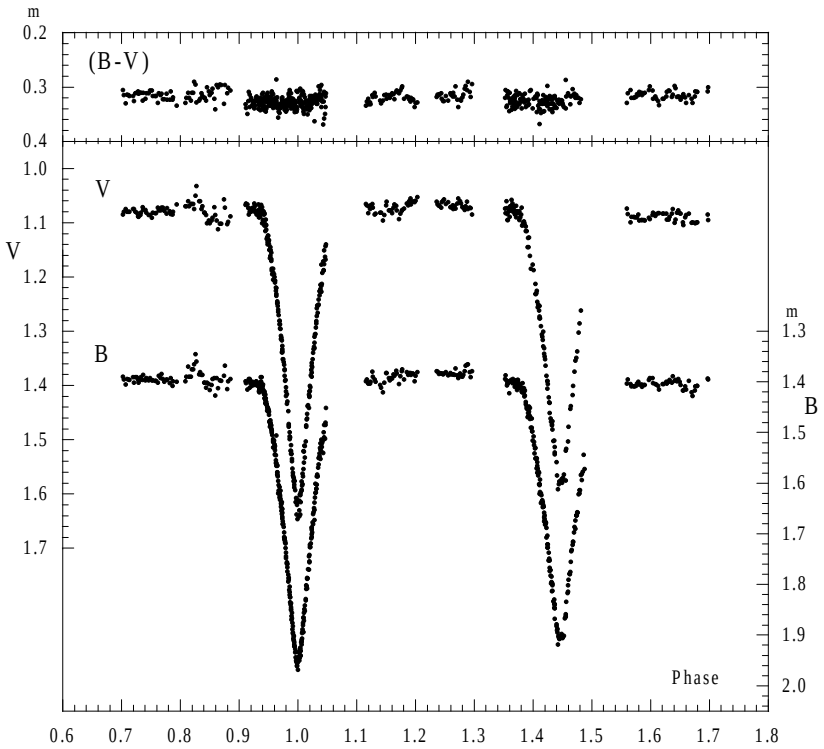

Figure 1. The light and color curves of DR Vul in 1993

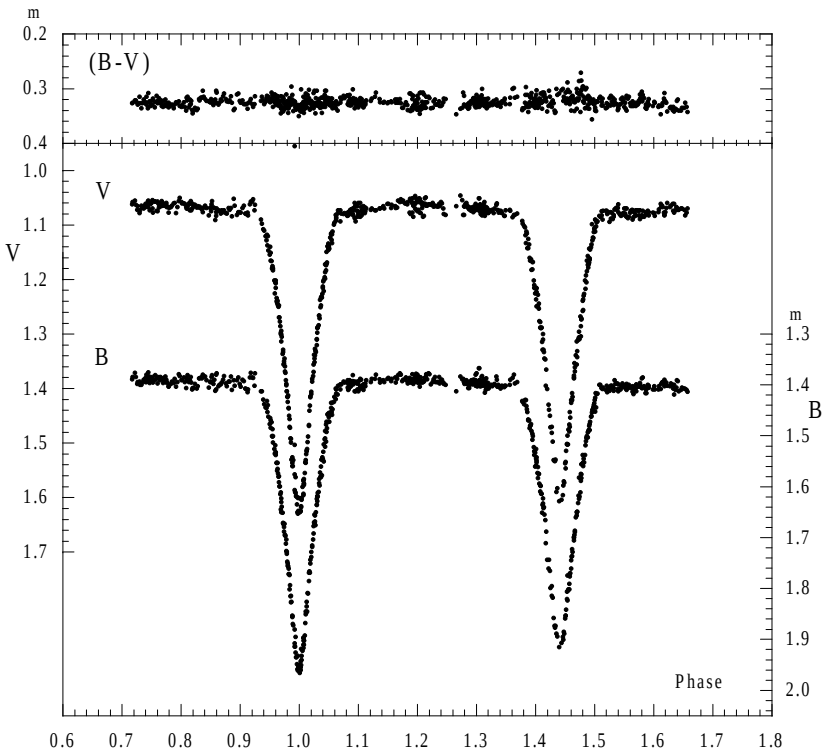

Figure 2. The light and color curves of DR Vul in 1994

Table 1: Photoelectric minima times of DR Vul, which are obtained in this work

JD Hel. 2400000 +	Filter	Min. Type	$O-C$	Observatory
49162.4627	B	I	0.0685	EUO
49163.4670	B	II	−0.0524	EUO
49180.4704	B	I	0.0718	EUO
49181.4774	B	II	−0.0465	EUO
49189.4755	B, V	I	0.0746	EUO
49198.4774	B, V	I	0.0743	EUO
49207.4816	B, V	I	0.0763	EUO
49208.4878	B, V	II	−0.0428	EUO
49216.4854	B, V	I	0.0779	EUO
49225.4893	B, V	I	0.0795	EUO
49574.3833	B, V	I	0.1372	EUO
49575.3788	B, V	II	0.0075	EUO
49592.3911	B, V	I	0.1406	EUO
49593.3869	B, V	II	0.0111	EUO
49601.3953	B, V	I	0.1425	EUO
49610.3998	B, V	I	0.1448	EUO
49611.3932	B, V	II	0.0129	EUO
51737.4606	B, V	I	0.4294	TNO
51738.3922	B, V	II	0.2357	TNO

Remarks:

DR Vul, which is a well-known eclipsing binary star with apsidal motion, was observed photoelectrically at the Ege University Observatory (EUO) on 40 nights during 1993 and 1994 observing seasons and at the TÜBİTAK (Scientific and Technical Research Council of Turkey) National Observatory (TNO) on 2 nights during 2000 observing season. During the observations no significant light variation of the comparison and check star was found. The atmospheric extinction coefficients in each color for each observational night were calculated from the observations of the comparison star using conventional method. Then, all the instrumental differential B and V magnitudes (in the sense variable minus comparison) were corrected for the atmospheric extinction and the light time effect of the Earth's motion. The instrumental differential B and V light and $B-V$ color curves are shown in Figures 1 and 2.

During the observations, I obtained 12 primary and 7 secondary times of minimum light. These times of the minima are presented in Table 1. The times of the minima given in Table 1 are averaged values of the eclipse times obtained in B and V colors during the same observational night. The $O-C$ values were calculated using the following light elements given by Çiçek (1995):

$$\mathrm{HJD}_{\mathrm{min\,I}} = 2449162.4631(2) + 2\overset{\mathrm{d}}{.}2509350(15) \times E.$$

The photometric phases in Figures 1 and 2 are calculated with the formula (1). The shape of the light curves of DR Vul is typical of EA type. As seen from the light curves, the phase of the mid-secondary minimum (0.447 in 1993 and 0.440 in 1994) is clearly shifted from 0.5, and no significant variation at minima in $B-V$ color curves was found.

Acknowledgements:

We would like to present our thanks to the Ege University Observatory and TÜBİTAK National Observatory for partial financial and equipment support.

Reference:

Çiçek, C., 1995, unpublished Ph.D. Thesis, Ege University.