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FIRST BVR PHOTOMETRY OF V821 CASSIOPEIAE

DEĞİRMENÇİ, Ö. L.¹; BOZKURT, Z.¹; YAKUT, K.¹; DEMİRCAN, O.²; ERDEM, A.²;
ÇİÇEK, C.²; ÖZDEMİR, S.²; BULUT, İ.²; SOYDUGAN, F.²; SOYDUGAN, E.²; ESENOĞLU, H.³;
HEGEDÜS, T.⁴; BORKOVITS, T.⁴; BÍRÓ, I. B.⁴

¹ Ege University Observatory, TR-35100 Bornova, İzmir, Turkey; e-mail: omerd@astronomy.sci.ege.edu.tr

² Çanakkale Onsekiz Mart University, Faculty of Arts and Sciences, Department of Physics, TR-17100 Çanakkale, Turkey

³ İstanbul University Observatory, TR-34452 İstanbul, Turkey

⁴ Baja Astronomical Observatory of Bács-Kiskun County, Baja, Szegedi út, P.O. Box 766, H-6500, Hungary

Name of the object:	
V821 Cas = BD +52°3571 = HIP 118223 = HD 224557	
Equatorial coordinates:	Equinox:
R.A. = 23 ^h 58 ^m 49 ^s .17 DEC. = +53°40'19".8	2000
Observatory and telescope:	
Ege University Observatory, 48-cm Cassegrain telescope Baja Observatory, 50-cm Ritchey-Chrétien telescope	
Detector:	Hamamatsu, R 4457 (PMT) SiTE 502B (Apogee AP-7 CCD)
Filter(s):	Johnson <i>B</i> , <i>V</i> and <i>R</i> unfiltered (Baja)
Comparison star(s):	BD +52°3575 = HIP 118259 GSC 4001-0292, 4001-1473 (Baja)
Check star(s):	BD +52°3580 = SAO 35989
Transformed to a standard system:	No
Availability of the data:	
Upon request	
Type of variability:	EA

Remarks:

In this paper we present B , V and R light curves of the eclipsing binary V821 Cas. The variability of V821 Cas was discovered by HIPPARCOS (ESA, 1997). The photometric observations of the system by HIPPARCOS show an EA type light curve. The light elements of the system were given (ESA, 1997) as follows:

$$\text{HJD Min. I} = 2448500.4459 + 1^{\text{d}}76975 \times E. \quad (1)$$

The spectral type of the system is given as A0 (The Henry Draper Catalogue, Cannon and Pickering, 1918-24). We observed V821 Cas on 9 nights at the Ege University Observatory and 4 nights at Baja Observatory. The derived light curves for B , V , R colours are illustrated in Figure 1. The obtained minima times are given in Table 1. Individual least-squares fits to the primary and the secondary times of minima give the following linear elements:

$$\text{HJD Min. I} = 2451767.4106(4) + 1^{\text{d}}7697534(6) \times E, \quad (2)$$

$$\text{HJD Min. II} = 2451768.167(4) + 1^{\text{d}}7696(2) \times E. \quad (3)$$

The ($O - C$) values in Table 1 are calculated using the above elements. The phases in figure 1 are calculated using the light elements of equation (2). The probable difference between two periods in equations (2) and (3) indicates the existence of apsidal motion in the system. New observations show that the duration of the secondary minimum is longer than the primary one in each colour (the mean durations are $0^{\text{d}}258$ and $0^{\text{d}}241$, respectively). The location of the secondary minima in the light curve appears clearly shifted from phase 0.5 to phase 0.425. We can deduct an orbital eccentricity of roughly 0.12, and a periastron angle of 163 degrees for the initial epoch given in equation (2). Thus, our observations confirm the system as a new candidate for the study of apsidal motion (Giménez and Hegedüs, 2000).

Table 1

Times of minima:						
Star name	Time of min. HJD 2400000+	Error	Type	Filter	$O - C$ [day]	Rem.
V821 Cas	51767.4100 (1)	I	–	–0.0006	Baja	
	51774.4893 (2)	I	–	–0.0003	Baja	
	51797.4962 (2)	I	–	–0.0002	Baja	
	51797.4967 (4)	I	B, V, R	0.0003	Ege	
	51805.330 (1)	II	B, V, R	0.0014	Ege	
	51819.4840 (8)	II	B, V, R	–0.0014	Ege	
	51835.4153 (6)	II	–	0.0035	Baja	

Acknowledgements:

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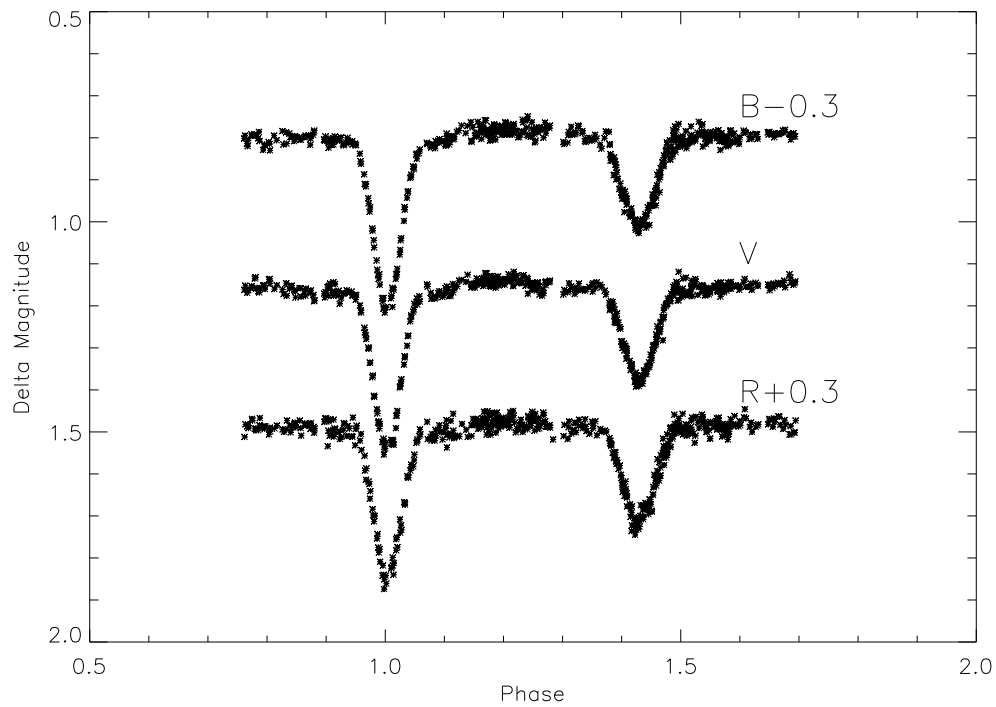


Figure 1. *B*, *V* and *R* light curves of V821 Cas obtained at the Ege University Observatory.

References:

- Cannon, A. J. and Pickering, E. C., 1918-1924, *The Henry Draper Catalogue*, Ann. Astron. Obs. Harvard College, **91-99**
ESA, 1997, *The Hipparcos and Tycho Catalogues*, SP-1200
Giménez, A. and Hegedüs, T., 2000, *Catalogue of Detached Eccentric Eclipsing Binary Systems* (electronic database)