COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS

Number 5872

Konkoly Observatory
Budapest
15 January 2009

HU ISSN 0374 – 0676

CCD PHOTOMETRY OF NEW VARIABLE STARS AND BX DRA

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Observatory and telescope:
A 155mm Refracting Telescope (f=1050mm) of the Bohyunsan Optical Astronomy Observatory (BOAO)

Detector:	2k × 3k CCD Camera, AP9E, FOV= $60' \times 90'$

Filter(s):	Johnson B, V

Method of data reduction:
Aperture photometry using the IRAF/DAOPHOT package (Massey & Davis 1992).

Remarks:
We obtained time-series BV CCD images of BX Dra for 17 nights between April and August 2008 using a small refracting telescope (ϕ =155mm, f =1050mm) in Bohyunsan Optical Astronomy Observatory (BOAO). Most observation was carried out by remote-control system. We examined light variations of 760 stars in the observing field by eyes. As a result, we discovered five new field variable stars including two suspected variable stars around an eclipsing binary star BX Dra. They are two eclipsing binary stars, a long-term variable star and two RR Lyrae stars. One of the RR Lyrae stars, V1, shows Blazhko effect. We marked the variable stars in Figure 1. Light curves of the new variable stars and BX Dra are shown in Figure 2 and Figure 3. We were normalized the mean differential V magnitudes of the variable stars to 0.0. For B magnitudes, we added 1.5 mag for V1 and V3, 0.5 mag for V2 and BX Dra and 0.2 mag for V4 and V5, respectively. Photometric properties of the variable stars are listed in Table 1. We re-calculated the period of BX Dra using minima of Agerer & Dahm (1995; Eq. (2))

Acknowledgements:
This research has made use of the SIMBAD database, operated at CDS, Strasbourg, France, and of NASA's Astrophysics Data System. This research was supported in part by the 2008 Research & Education (R&E) program of Korea Science Academy.

Table 1: Coordinates and physical properties of new variable stars and BX-Dra

Name	R.A.+DEC (J2000.0; 2MASS)	NOMAD1 B	NOMAD1 V	Period (day)	V Amp (mag)	Type
V1	16082123+6229545	14.070	13.620	0.5344(5)[1]	0.75	RRab[2]
V2	16092751+6251085	14.900	14.370	0.4221(7)	0.22	EW
V3	16061479+6240149	15.380	15.210	0.5637(4)	0.63	RRab
V4	16104413+6226097	12.428	10.982	–	–	LB
V5	16074242+6249357	12.284	12.016	–	–	EA
BX Dra	16061736+6245460	10.978	10.626	0.5790278	0.54	EW

[1] It is difficult to define period because of Blazhko effect.
[2] Blazhko effect

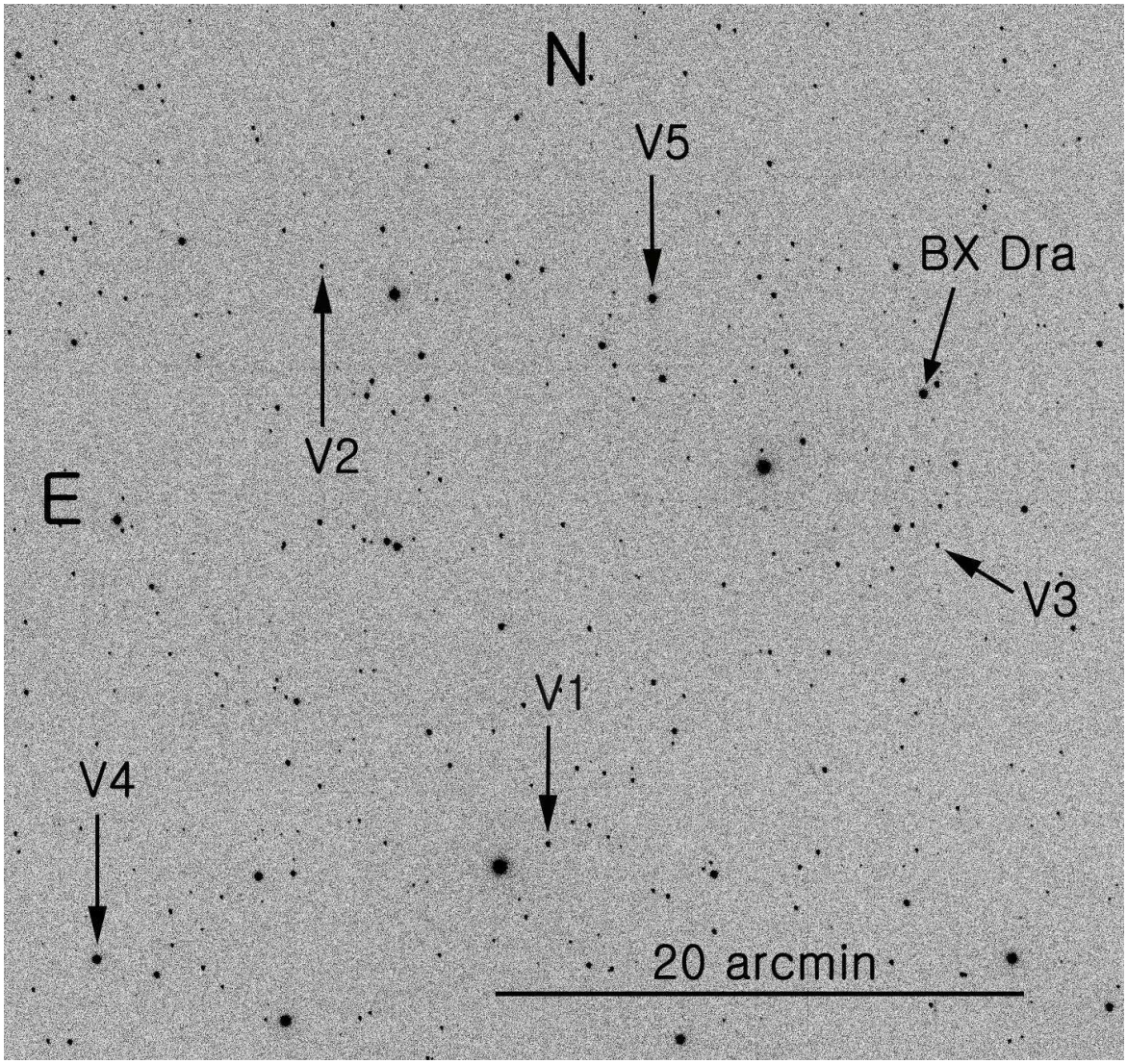

Figure 1. Finding map of new variable stars and BX Dra

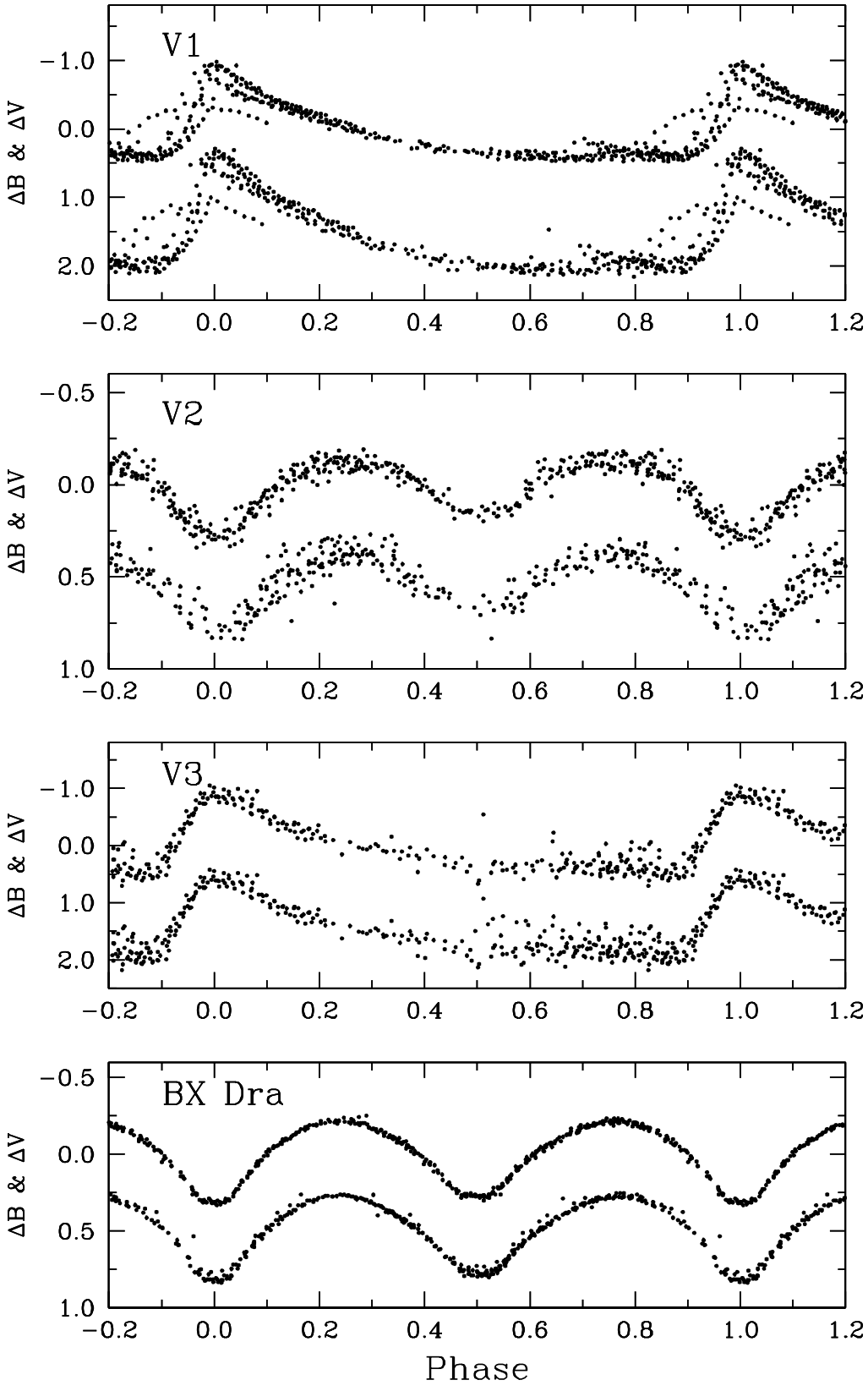

Figure 2. Light curves of three new variable stars and BX Dra

References:

Massey, P., Davis, L.E. 1992, *A User's Guide to Stellar CCD photometry with IRAF*
Agerer, F., Dahm, M. 1995, *IBVS*, **4266**

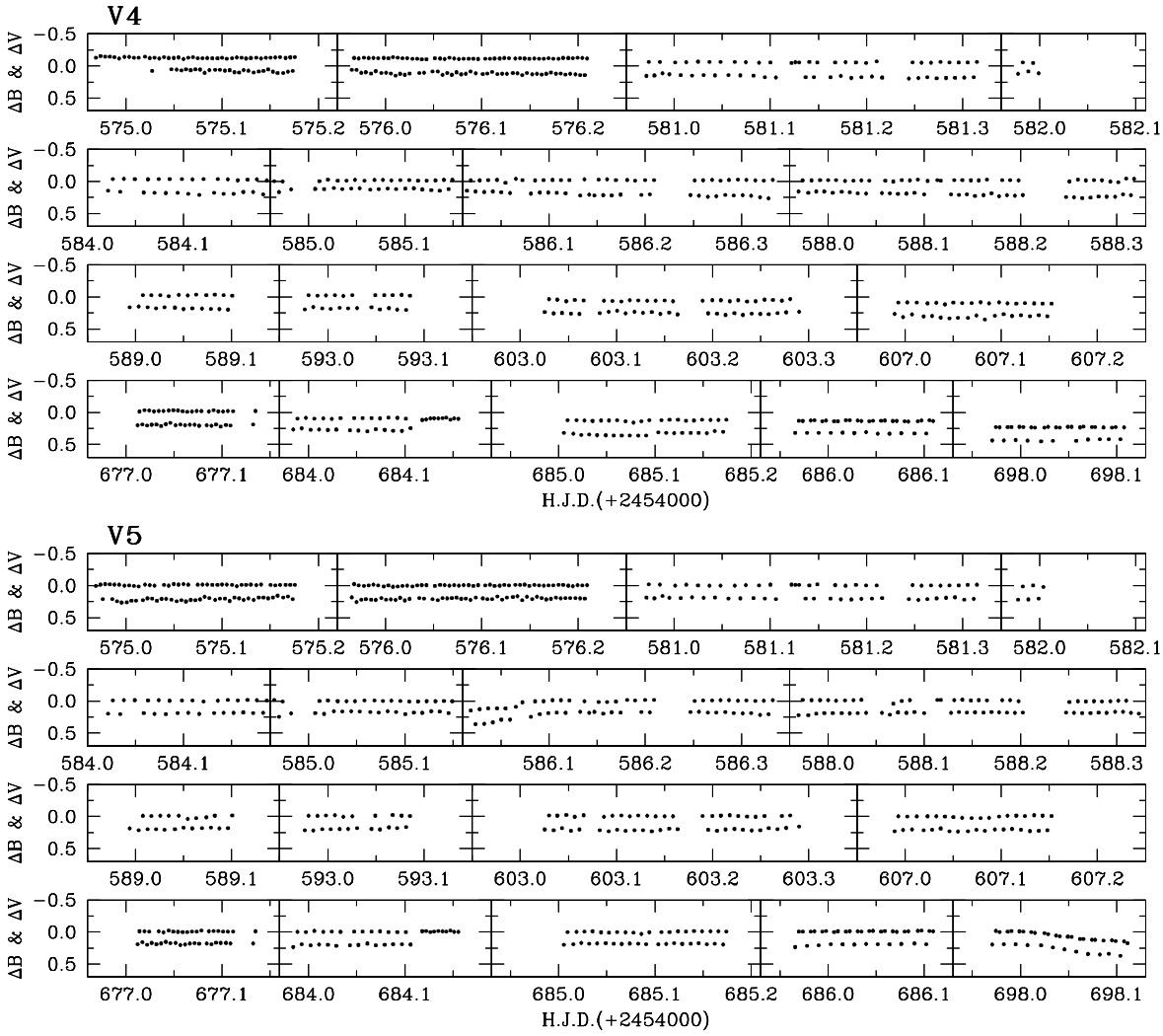

Figure 3. Light curves of two suspected variable stars