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

Number 2287

Konkoly Observatory
Budapest
1983 March 1

HU ISSN 0374-0676

PHOTOMETRIC OBSERVATIONS OF CATACLYSMIC VARIABLES *

Photometric observations of 24 cataclysmic variables in the UBV colour system were carried out during 11 nights in 1978 and 1979 at the 1-m-telescope of the European Southern Observatory at La Silla. All measurements were taken with the ESO one-channel photometer. For details concerning the measurements and the data reduction, see Bruch (1982a).

The results of the observations are given in Table I. In general, each star was observed once or twice in each colour. The errors of the brightness and colour indices were estimated from informations about photon statistics furnished by the photometer software (including statistical fluctuations of the night sky brightness, which is important for the faintest stars observed) and from the deviations of the individual measurements from the mean. Since the integration times per colour ranged between 60^s and 100^s and were thus not short compared to the flickering time scale, rapid brightness variations of the stars tend to enhance the errors.

Light curves of some of the brighter stars were observed with a time resolution between 300^s and 8^s for a period between 38^m and 297^m. In these cases, Table I gives the mean values of brightness and colours for each observing run. Here, the errors were computed solely from the deviations of the individual measurements from the mean. For all light curves, the brightness difference ΔV between the brightest and the faintest data point is also given in Table I in order to allow an estimate of the flickering amplitude. It is interesting to note that the flickering of the SU UMa - star WX Hyi (which belongs to those cataclysmic variables with particularly large flickering amplitudes; see Bruch, 1982a) is strongest on the decline from an outburst just before reaching the minimum stage. A comparatively low flickering amplitude is observed from the old nova HR Del; a fact which is interpreted elsewhere (Bruch, 1982b).

Most of the cataclysmic variables observed exhibit colours which are within the range normally found for these objects. There are, however, three exceptions.

* Based on observations collected at the European Southern Observatory

Table I: UBV colours of cataclysmic variables

Name	Date J.D. 2440000+	Type[1]	Phase[2]	V	B-V	U-B	N[3]	V
VY Aqr	4130	RN	m	17.08 ± 0.22	-0.18 ± 0.25	-0.80 ± 0.17	2	
VZ Aqr	4129	U	m	16.51 ± 0.16	0.78 ± 0.20	-0.32 ± 0.26	1	
AE Aqr	4129	NL		11.39 ± 0.03	0.85 ± 0.04	-0.09 ± 0.16	2	
UU Aql	4129	U	m	16.66 ± 0.18	0.71 ± 0.20	-1.28 ± 0.15	1	
FO Aql	4128	U	m	16.57 ± 0.14	0.66 ± 0.17	-0.58 ± 0.16	1	
V 725 Aql	4130	U	m	15.79 ± 0.11	1.52 ± 0.14	0.60 ± 0.47	2	
AT Ara	4131	U	m	14.25 ± 0.12	0.82 ± 0.09	-0.69 ± 0.12	2	
WW Cet	4126	Z	St?	14.04 ± 0.24	0.11 ± 0.24	-0.98 ± 0.15	13	0.88
	4131	Z	St?	14.16 ± 0.04	0.04 ± 0.05	-1.04 ± 0.02	2	
BP CrA	4129	Z	M	14.23 ± 0.07	0.10 ± 0.02	-0.79 ± 0.02	2	
HR Del	3724	N	m	12.16 ± 0.09	-0.05 ± 0.02	-0.84 ± 0.02	45	0.17
	3727	N	m	12.19 ± 0.05	-0.10 ± 0.01	-0.84 ± 0.02	23	0.16
	3728	N	m	12.14 ± 0.03	-0.09 ± 0.01	-0.82 ± 0.02	90	0.14
	3729	N	m	12.15 ± 0.04	-0.09 ± 0.01	-0.80 ± 0.02	99	0.12
	3730	N	m	12.10 ± 0.03*			500	0.14*
IS Del	4129	Z	St?	15.90 ± 0.07	0.09 ± 0.08	-0.65 ± 0.06	2	
WX Hyi	3724	SU	m	14.68 ± 0.37	0.08 ± 0.17	-1.14 ± 0.09	11	0.93
	3727	SU	m	14.85 ± 0.12	0.07 ± 0.11	-1.07 ± 0.11	35	0.53
	3728	SU	m	14.84 ± 0.11	0.01 ± 0.06	-1.10 ± 0.09	68	0.53
	3729	SU	m	14.75 ± 0.12			325	0.77
	3729	SU	m	14.72 ± 0.14*			350	0.68*
	3730	SU	m	14.76 ± 0.19	0.02 ± 0.07	-1.18 ± 0.09	125	0.94
	4127	SU	Dec	13.07 ± 0.09	0.20 ± 0.04	-0.02 ± 0.10	166	0.85
	4129	SU	Dec	14.21 ± 0.27	0.21 ± 0.11	-0.97 ± 0.15	170	1.43
	4130	SU	m	14.70 ± 0.16	0.08 ± 0.08	-1.16 ± 0.11	195	0.77
	4131	SU	m	14.66 ± 0.15	0.07 ± 0.07	-1.18 ± 0.10	141	0.65

Table I (continued)

Name	Date J.D. 2440000+	Type[1]	Phase[2]	V	B-V	U-B	N[3]	V
TU Ind	4129	U	m	15.32 ± 0.04	0.22 ± 0.06	-0.89 ± 0.03	2	
V 841 Oph	3724	N	m	13.39 ± 0.03	0.40 ± 0.02	-0.55 ± 0.04	9	0.09
	3727	N	m	13.22 ± 0.04	0.43 ± 0.03	-0.60 ± 0.04	16	0.18
	3728	N	m	13.28 ± 0.04	0.40 ± 0.03	-0.58 ± 0.04	15	0.14
	3729	N	m	13.10 ± 0.10	0.40 ± 0.03	-0.58 ± 0.04	101	0.26
	3730	N	m	13.03 ± 0.05	0.40 ± 0.02	-0.61 ± 0.04	83	0.20
	3730	N	m	13.44 ± 0.06*			451	0.32*
V 2051 Oph	4128	U	m	15.32 ± 0.06	0.00 ± 0.07	-0.90 ± 0.05	1	
BI Ori	4131	U	Dec?	14.56 ± 0.03	0.04 ± 0.04	-0.78 ± 0.03	2	
CN Ori	4131	Z	St?	12.81 ± 0.01	0.02 ± 0.01	-0.74 ± 0.01	2	
RU Peg	4129	U	m	12.64 ± 0.01	0.63 ± 0.02	-0.78 ± 0.05	2	
RZ Sge	4129	U	m	16.86 ± 0.23	0.56 ± 0.27	-0.78 ± 0.25	1	
MM Sco	4131	U	m	17.00 ± 0.16	1.53 ± 0.27	-0.70 ± 0.38	2	
FQ Sco	4130	U	m	16.83 ± 0.16	1.62 ± 0.28	-0.70 ± 0.44	2	
V 478 Sco	4131	U	m	16.27 ± 0.12	0.42 ± 0.14	-0.67 ± 0.11	2	
UZ Ser	4128	U	m	15.69 ± 0.08	0.14 ± 0.06	-0.71 ± 0.04	2	
FY Vul	4128	Z	m	14.80 ± 0.04	0.53 ± 0.04	-0.65 ± 0.04	2	

[1]: Type
N = nova
U = U Gem star
Z = Z Cam star
SU = SU UMa star
RN = recurrent nova
NL = novalike variable

[2]: Phase
m = minimum
M = maximum
St = standstill
Dec = decline

[3]: N = number of individual measurements

* = B-magnitudes

MM Sco has an extremely red B-V - colour index, but is blue in U-B. This might indicate an extreme intensity distribution between the hot primary and the cool secondary. Vogt (1981) measured red colours both in B-V ($0^m.8 \ldots 1^m.3$) and U-B ($0^m.2 \ldots 0^m.8$). It is doubtful that this discrepancy can be explained by normal colour variation due to flickering.

FQ Sco shows colours similar to MM Sco. However, it has a faint optical companion which might have been in the diaphragm and influenced the observations.

The colours of V 725 Aql resemble those of the recurrent nova T CrB (Bruch, 1980; Walker, 1957).

Since all three systems have been observed quite inadequately so far, the results for these stars await confirmation by independent observations.

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* copies are available from the author on request