

UBV PHOTOMETRY OF KNOWN AND POTENTIAL VARIABLE STARS

K. KRISCIUNAS*
 903 Edgewater Drive
 Naperville, IL 60540

*Guest observer, Leuschner Observatory,
 University of California, Berkeley

ABSTRACT

Standardized UBV photometry of seven early M emission-line dwarfs, seven Mira stars, and also SS Cygni is presented. The dMe stars have not been previously observed in the UBV system to the accuracy presented here. The short time scale (< 1 min.) variations observed in the light output of SS Cygni are similar to those found by Walker and Chincarini (1968).

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The 76-cm reflector of the Leuschner Observatory of the University of California at Berkeley was used on the nights of 1-3 August 1975 (JD 2442626-8) to obtain the photoelectric data presented in this paper. The photometer employed a 1P21 photomultiplier tube cooled with dry ice. The filters were: U: Corning 9863, standard optical thickness; B: Corning 5030, standard optical thickness, with 2-mm Schott GG 13; V: Corning 3384, standard optical thickness. Transformation to the UBV system was accomplished using an average of a dozen stars per night with known UBV magnitudes (Johnson *et al.* 1966). Probable errors of ± 0.02 mag. or less were obtained.

The M emission-line dwarfs were selected from Gliese's Catalog of Nearby Stars (1969). This type of star can be a flare star or a small-amplitude variable with a time scale of days (Robinson and Kraft 1974, Krzeminski 1969). None of the dMe stars in Table I had previously been observed in the UBV system to the accuracy shown here. † The spectral types were taken from Gliese's catalog. Only Gl 851.1 was observed twice. §

TABLE I

Photometry of dMe Stars

Star	Spectrum	V	B-V	U-B
Gl 685	dM1e	9.94 \pm 0.02	1.46 \pm 0.01	1.20 \pm 0.02
Gl 694.2	dM1.5e	10.71	1.43	1.21
Gl 697.1	dM0e	10.12	1.33	1.23
Gl 710	dM1e	9.63	1.38	1.24
Gl 731	dM2e	10.15	1.48	1.14
Gl 804	dM1.5e	10.29	1.44	
Gl 851.1	dM0e	10.12	1.17	1.12

With the exception of the B-V listed for Gl 851.1, the B-V colors in Table I are in agreement with data given in Gliese's catalog for stars of similar spectral types. Gl 851.1 has UBV colors more like that of a dK5e star. However, its resulting absolute magnitude of 8.48 (using Gliese's value of 0^m.047 for the para-

† Due to poor data for the U magnitude of Gl 804, no U-B color for this star is listed in Table I.

§ Gl 851.1 was brighter than BD +30°4634 by 0.05 and 0.02 mag in V on 1/2 Aug and 3/4 Aug, respectively, indicating a possible, but not statistically significant dimming of 0.03 mag. Using BD +30°4634 (V=10.15) and BD +30°4629 (V=9.90) as comparison stars, Gl 851.1 was monitored for a total of 24 hours on seven nights from September, 1975, to September, 1976, and no flares ($\Delta V > 0.1$) were observed, indicating that Gl 851.1 is probably not an active flare star.

lax) places it a full magnitude below the main sequence in the color-magnitude diagram, where the slope of the main sequence is still quite shallow.

Table II gives standardized UBV data for seven Mira type variable stars, and also for the dwarf nova SS Cygni.

TABLE II
Photometry of Known Variable Stars

Star	Date (UT) 1975	UT	V	B-V	U-B
T Ari	3 Aug	1150	8.75±0.02	1.65±0.01	0.89±0.02
W Lyr	3 Aug	0814	12.58		
R Aql	3 Aug	0820	6.92	1.58	0.51
U Cyg	2 Aug	0840	8.58	4.10	2.96
T Cep	4 Aug	0909	6.42	1.74	0.57
SS Cyg	2 Aug	0900	10.48	0.02	-0.84
"	3 Aug	0833	11.07	0.16	-0.75
"	4 Aug	0826	11.21	0.39	-0.67
W Peg	4 Aug	1050	12.13		
WZ Cas	3 Aug	0954	7.03	2.90	

As one can see from the data in Table II, SS Cygni dimmed by 0.73 mag in V over the two day time span. The system was dying down from an outburst which occurred on 20/21 July (Thorstensen 1975). This author visually estimated $m_V \approx 8.4$ on the evening of 21/22 July.

The 3/4 August, 1975, data for SS Cygni were gathered over a period of 23 minutes--given are the mean values--, and during this time the light output of the system was noted to change (flicker) in U, B, and V on the order of 0.05, 0.06, and 0.03 mag, respectively, with a time scale of < 1 min. This is similar to what was found by Walker and Chincarini (1968).

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