

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 855

Konkoly Observatory
Budapest
1973 December 31

A NEWLY DISCOVERED W URSAE MAJORIS SYSTEM: ADS 1693 A

ADS 1693 A ($2^{\text{h}}05^{\text{m}}9$, $+44^{\circ}12'$; 1900) is the brightest component of a multiple star system (see Figure I). In 1908 Espin mentioned that either the A or the B component was a variable. In 1971 and 1972 F. Josties and J. Christy obtained multi-exposure-astrometric plates of this system at the U.S. Naval Observatory in Washington, D.C. Visual estimates from these plates by K.A.A.Strand showed the A component to be variable with a brightness change of 0.6 magnitudes in thirty minutes.

In October and November of 1973 250 sets of UBV observations were obtained of ADS 1693 A on five nights with the 102 cm reflector at the Flagstaff Station of the U.S. Naval Observatory. The information obtained from these data is tabulated in this report.

A composite light curve of observations obtained on two consecutive nights is presented in Figure II. Close examination of the individual light curves for each night show variations in the maxima and minima. This is typical of W Ursae Majoris systems.

Times of minima were determined by the Hertzsprung method and are listed in Table I. All the minima were combined by the method of least squares and produced the following light elements:

$$T_I = 244\ 1976.69136 \pm 0.^{\text{d}}30573\ \text{n}$$

From the residuals in Table I it is obvious that the period is not constant over the observed interval (another characteristic of W Ursae Majoris systems). A second set of light elements was determined using only the primary eclipses:

$$T_{II} = 244\ 1976.69458 \pm 0.^{\text{d}}30501\ \text{n}$$

The magnitudes and colors of the variable at maxima and minima are given in Table II. The B component was used as the comparison star and the C and D components were used as check stars (see Table III).

The spectral types listed in Tables II and III were inferred from the colors (assuming no reddening) and were based upon the work of M.P. Fitzgerald (Astron. and Astrophys. 1970, 4, 234). The spectral types listed in Table II are further evidence that ADS 1693A is a W Ursae Majoris system.

Table I
Times of Minima

JD O	Eclipse	n	T _I O-C	T _{II} O-C
244 0000.0000+				
1976.8470	sec	0.5	+0.0028	-0.0001
1977.7605	sec	3.5	-0.0009	-0.0016
1977.9146	pri	4.0	+0.0003	0.0000
1992.8599	pri	53.0	-0.0352	0.0000
1993.9981	sec	56.5	+0.0330	+0.0707

Table II
Magnitudes and Colors of ADS 1693 A

Phase	V	B-V	U-B	sp
0.00	11.61	+0.82	+0.35	K0
0.25	10.88	+0.74	+0.24	G7
0.50	11.58	+0.80	+0.34	K0
0.75	10.83	+0.77	+0.27	G7

Table III
Magnitudes and Colors of Comparison and Check Stars

Star	V	B-V	U-B	sp
ADS 1693 B	11.13	+0.70	+0.18	G5
ADS 1693 C	11.91	+1.10	+0.89	K4
ADS 1693 D	12.65	+0.72	+0.30	G7

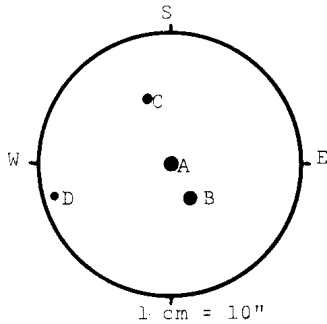


Figure I

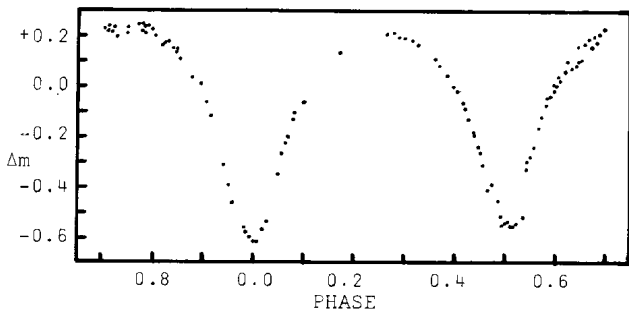


Figure II

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