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RECENT DATA ON 22 VULPECULAE

Parsons and Ake (1984) recently appealed for observations of 22 Vul to be made during its eclipse in August 1984. The star is a ζ Aur-like system, containing a G3 supergiant with a B9 companion in a 249^d orbit.

We present here photoelectric photometry and radial velocity measurements made by us at the David Dunlap Observatory during this time.

The photometry is on the standard Stromgren four-colour system and also includes measures of the β -index and (V-R) and (V-I) on the Kron-Cousins system. It was obtained with a twin-photometer two-telescope photon-counting system involving our 0.5 m and 0.6 m telescopes, in which one telescope observes the variable while the other observes the comparison star. Each photometer is itself a two-channel device with a chopper that removes the sky background signal at the relatively high speed of 60 Hz. The system is automated under computer control to ensure exact simultaneity of the observations. The relative sensitivities of the two units is monitored frequently by setting both telescopes on the same star, but drift has been found negligible at the level of two or three thousandths of a magnitude over a night.

We used the comparison star, HD 192712, recommended by Parsons and Ake. Absolute photometry of this star on four good nights was consistent and yielded the values shown in Table I. The standard errors listed are internal, based on the fourteen observations per filter made on the four nights. All our results for 22 Vul are derived from differential measures referred to the values of HD 192712 given in Table I. Note, however, that our V magnitude of 7.184 for HD 192712 is somewhat fainter than 7.15 quoted by Parsons and Ake.

TABLE I
Photometry of HD 192712

V = 7.184 ± 0.004	β = 2.608 ± 0.007
b-y = 0.574 0.005	(V-R)KC = 0.546 0.002
m1 = 0.423 0.005	(V-I)KC = 0.944 0.004
c1 = 0.380 0.010	

The data for 22 Vul are listed in Table II. Each number is the average of four or five observations made per night, with a typical internal standard error of 0.004 mag, except for the c1 measures. Here, owing to the involvement of the u-filter, red stars, and old mirror-coatings, the standard errors average 0.025 mag.

Plots of our data show that they do encompass the shallow eclipse of the star, but since Parsons is to collate data from all observers for discussion, any discussion here would be premature.

TABLE II
Photometry of 22 Vul

HJD	V	b-y	m1	c1	β	(V-R)KC	(V-I)KC
2445929.677	5.167	0.623	0.397	0.320	2.662	0.527	1.010
30.677	5.199	0.610	0.437	0.316	2.641	0.544	1.010
32.649	5.202	0.611	0.432	0.302	2.655	0.539	1.013
34.652	5.191	0.613	0.410	0.356	2.659	0.523	1.003
37.668	5.233	0.659	0.505	0.293	2.643	0.546	1.028
39.667	5.226	0.662	0.519	0.493	2.648	0.546	1.030
43.662	5.236	0.671	0.484	0.400	2.644	0.547	1.021
48.603	5.194	0.633	0.387	0.360	2.673	0.534	1.027
50.625	5.173	0.630	0.400	0.421	2.738	0.538	1.011
61.588	5.180	0.626	0.413	0.336	2.655	0.530	0.988
64.612	5.183	0.626	0.410	0.266	2.657	0.525	0.991

We also obtained five spectrograms of 22 Vul on vacuum sensitized IIaO plates with the cassegrain spectrograph attached to our 1.9 m telescope. The first spectrogram was obtained by Dr Nancy Evans in June 1981 and covered the spectral region 3500 to 4950 Å at 12 Å/mm. The other four were taken in September 1984, covering 3500 to 4600 Å at 8 Å/mm. Projected slit width was 22 microns, and the spectra were widened to either 0.5 or 0.8 mm.

All the spectra were digitized with the Observatory's PDS microdensitometer. The radial velocity of the primary was determined from the digitized spectra using a computer program which determines the positions of selected absorption

TABLE III
Radial Velocities of 22 Vul

HJD	Rad. Vel. km/sec	s.e. km/sec	Comment
2444782.816	+1.1	0.4	
5961.622	-6.9	0.3	
5962.600	-6.5	0.4	Some flexure
5963.635	-6.6	0.4	
5964.667	-5.2	0.4	

lines using least-squares parabolic fits to the line cores. Typically 30 to 35 lines were used. Table III contains the results. Weak CaII H and K emission, probably associated with the G3 supergiant, can be seen on all the spectra. Again, any discussion here would be premature.

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Reference:

Parsons, S.B., and Ake, T.B. 1984, AAVSO Photoelectr. Phot. Newsltr,
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