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OBSERVATIONS OF UV CETI DURING  
THE 1972 OCTOBER 1-15 INTERNATIONAL PATROL

During part of the International Patrol of 1972 October, UV Ceti was observed for a total of 26.5 hours resulting in 50 detected flare events. All photoelectric observations were obtained on the 76-cm reflector at McDonald Observatory. A few time-resolved spectroscopic observations were also obtained by B. W. Bopp on the 208-cm Struve reflector at McDonald Observatory. This report is only preliminary. A complete discussion of these observations will be published at a later date.

INSTRUMENTATION

The photoelectric observations were obtained with a high speed pulse counting photometer using a specially selected Amperex 56 DVP photomultiplier tube operated uncooled. The basic instrument is described by Nather and Warner 1971 (1).

In most cases, no filter (NF) was used in order to study very rapid variations during flare events (2). With no filter employed, the band-pass of the system is defined by the spectral response of the

Amperex 56 DVP. The photocathode is a bialkali type D which has a maximum response (25% Q.E.) at 4000 Å, and half response points at 3100 and 5200 Å.

When using integration times of less than one second, the data is stored in the computer's memory (8K). Approximately two hours are required to dump the memory onto paper tape and, for this reason, some flares were observed for which the data was not saved. These flares are indicated by (\*) in Table 2.

#### OBSERVATIONS

Table 1 gives the exact times (UT) of the observations. Sky readings are included in these intervals but since a sky measurement required only 10 seconds the coverage can be considered almost complete over any time interval.

Table 2 gives preliminary values of some flare characteristics of the observed events. Columns 3 and 4 give the heliocentric Julian date and Universal Time (with heliocentric time correction included) of the peak intensities. Approximate heliocentric time corrections for UV Ceti are given below:

72 OCT 10	+447s
72 OCT 11	+446s
72 OCT 13	+445s
72 OCT 14	+444s
72 OCT 15	+443s

Column 5 contains the maximum flare intensity defined by:

$$I_{\max} = \frac{I_0 + I_{\text{flare}}}{I_0} - 1$$

where  $I_0$  is the intensity of the star a short time before the onset of the flare. Column 6 was included to conform to suggestions made by the IAU Working Group on Flare Stars (3). It should be noted that for pulse counting observations, this term ( $3\sigma/I_0$ ) overestimates the error associated with the peak intensity since it does not take into account that the photon noise is a function of the count rate. Column 7 is the total relative energy (R.E.) of the flare event. The unit of relative energy is the amount of energy radiated by the quiescent star in the stated bandpass in one second. The integration time (IT) is stated in column 8.

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and

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October 30, 1972

#### REFERENCES

- (1) Nather, R.E., and Warner, B. 1971, M.N.R.A.S., 152, 209.
- (2) Moffett, T.J. 1972, Nature (in press).
- (3) Chugainov, P.F. 1971, IBVS No. 605.

TABLE 1

COVERAGE OF UV CETI

UT DATE	FROM(UT)	TO(UT)	$\Delta T$ (s)
72 OCT 10	05 46 30	06 21 00	2070
	06 25 36	07 09 53	2657
	07 11 15	07 42 56	1901
	07 43 07	08 17 03	2036
	08 17 11	08 47 12	1801
	08 48 13	09 22 11	2038
72 OCT 11	03 58 00	04 34 15	2175
	04 37 44	05 07 56	1812
	05 08 05	05 38 07	1802
	05 38 16	06 08 18	1802
	06 08 25	06 31 26	1381
	06 37 30	07 07 31	1801
	07 07 40	07 37 41	1801
	07 37 48	08 07 51	1803
	08 08 00	08 47 30	2370
	08 48 12	09 14 59	1607
	09 16 03	09 37 44	1301
72 OCT 12	03 55 57	04 50 12	3255
	08 04 00	09 48 00	6240
72 OCT 13	03 23 00	03 26 00	180
	03 30 16	04 31 06	3650
	04 31 50	05 01 50	1800
	05 02 01	05 32 01	1800
	05 34 00	06 12 35	2315
	06 17 38	06 47 38	1800
	06 48 16	07 18 16	1800

	07 18 46	07 48 46	1800
	07 48 53	08 18 53	1800
	08 20 01	08 50 01	1800
	08 50 07	09 20 07	1800
	09 20 14	09 50 14	1800
72 OCT 14	03 25 02	03 55 02	1800
	03 55 12	04 25 12	1800
	04 25 18	05 09 46	2068
	05 22 00	06 52 30	5430
	06 56 42	07 26 59	1817
	07 31 27	08 04 54	2007
	08 05 04	08 39 30	2066
	08 39 39	09 27 59	2900
72 OCT 15	03 47 14	04 27 17	2403
	04 27 26	04 58 21	1855
	05 00 07	05 30 16	1809
	05 38 00	07 15 00	5407

SUMMARY

UT DATE	TOTAL TIME (s)	TOTAL TIME (hr, min, s)
72 OCT 10	12503	03 28 23
72 OCT 11	19655	05 27 35
72 OCT 12	9495	02 38 15
72 OCT 13	22345	06 12 25
72 OCT 14	19888	05 31 28
72 OCT 15	11474	03 11 14

TABLE 2  
Flare Characteristics

FLARE NO.	UT DATE	UV CETI						
		JD <sub>⊙</sub> 2441600.+	(UT) <sub>⊙</sub>	I <sub>max</sub>	3σ/I <sub>⊙</sub>	R.E.	IT	F
1	72 OCT 10	0.748596	5 57 58.7	.86	.15	4.35	0.25	NF
2		0.790763	6 58 41.9	.14	.08	5.56	1.00	NF
3		0.797916	7 8 59.9	.27	.08	2.13	1.00	NF
4(1)		0.798958	7 10 30.0	.17	.08		1.00	NF
5(1)		0.799085	7 10 40.9	.14	.08	12.51	1.00	NF
6(1)		0.799236	7 10 54.0	.38	.08		1.00	NF
7		0.857453	8 34 43.9	.51	.07	6.73	1.00	NF
8		0.861990	8 41 15.9	.14	.07	0.41	1.00	NF
9		0.866446	8 47 40.9	.58	.07	9.51	1.00	NF
10		0.877476	9 3 33.9	1.08	.09	23.23	1.00	NF
11		0.892916	9 25 47.9	.18	.09	3.31	1.00	NF
12	72 OCT 11	1.674280	4 10 57.8	.29	.21	2.44	0.25	NF
13		1.681595	4 21 29.8	1.81	.21	22.55	0.25	NF
14		1.701731	4 50 29.6	.17	.09	6.43	1.00	NF
15		1.713259	5 7 5.6	.31	.09	7.70	1.00	NF
16		1.758108	6 11 40.5	.13	.10	1.12	1.00	NF
17		1.764983	6 21 34.5	.26	.09	4.35	1.00	NF
18		1.772448	6 32 19.5	.15	.09	4.80	1.00	NF
19		1.791626	6 59 56.5	.23	.09	18.81	1.00	NF
20		1.802726	7 15 55.5	.95	.09	5.81	1.00	NF
21		1.857818	8 35 15.5	.73	.09	90.10	1.00	NF
22		1.865028	8 45 38.4	.24	.09	6.36	1.00	NF
23		1.866568	8 47 51.5	.47	.09	59.64	1.00	NF

FLARE NO.	UT DATE	JD <sub>⊙</sub> 2441600.+	(UT) <sub>⊙</sub>	I <sub>max</sub>	3σ/I <sub>⊙</sub>	R.E.	IT	F
24		1.875353	9 00 30.5	.57	.09	10.03	1.00	NF
25		1.878952	9 5 41.5	.22	.09	9.20	1.00	NF
26		1.885654	9 15 20.5	.21	.09	13.10	1.00	NF
27		1.887656	9 18 13.5	2.73	.09	39.33	1.00	NF
28	72 OCT 13	3.742235	5 48 49.1	.52	.19	21.81	0.25	NF
29		3.747246	5 56 2.1	.52	.19	15.69	0.25	NF
30		3.818568	7 38 44.3	.22	.10	2.13	1.00	NF
31		3.839285	8 8 34.2	.16	.09	4.63	1.00	NF
32		3.856970	8 34 2.2	1.19	.10	58.05	1.00	NF
33		3.858105	8 35 40.3	2.91	.10	306.59	1.00	NF
34		3.873706	8 58 8.2	1.37	.10	25.25	1.00	NF
35		3.898022	9 33 9.1	.42	.11	24.37	1.00	NF
36	72 OCT 14	4.700006	4 48 0.5	.21	.09	4.86	1.00	NF
37*		4.734311	5 37 24.5	--	--	--	0.25	NF
38		4.771767	6 31 20.7	1.43	.16	40.24	0.25	NF
39		4.776767	6 38 32.7	.40	.16	5.80	0.25	NF
40 <sup>(2)</sup>		4.823257	7 45 29.4	3.39	.81	450.59	1.00	U
41 <sup>(2)</sup>		4.859380	8 37 30.4	8.15	.70	606.99	1.00	U
42 <sup>(2)</sup>		4.868407	8 50 30.4	127.11	.78	5068.99	1.00	U
43 <sup>(2)</sup>		4.892006	9 24 29.3	1.74	.78	51.51	1.00	U
44		4.894148	9 27 34.4	1.37	.78	119.26	1.00	U
45*	72 OCT 15	5.750561	6 00 48.0	--	--	--	0.25	NF
46* <sup>(2)</sup>		5.759994	6 14 23.0	--	--	--	0.25	NF
47* <sup>(2)</sup>		5.766938	6 24 00.0	--	--	--	0.25	NF
48* <sup>(2)</sup>		5.771452	6 30 53.0	--	--	--	0.25	NF
49* <sup>(2)</sup>		5.778917	6 41 38.0	--	--	--	0.25	NF
50* <sup>(2)</sup>		5.800271	7 12 23.0	--	--	--	0.25	NF

## NOTES:

- (1) FLARE NO. 4, 5 and 6 are included in the relative energy of No. 5
- (2) Spectra
- (\*) ORIGINAL DATA NOT SAVED. SMALL FLARE  $I_{\max} < 0.2$ .