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ON THE VARIABILITY OF THE MIRA STAR UX CYGNI

On two occasions the Mira variable UX Cygni has been reported to vary in brightness by more than one magnitude on time scales of one hour or less. The first report (1) described a decrease in brightness by 1.4 magnitudes within 12 minutes. The second (2) indicated an increase by 1.3 magnitudes within one hour. The first instance occurred 38 days before the 1933 visual maximum, and the second occurred 21 days before the 1944 maximum.

In an attempt to refine the description of this phenomenon and to investigate the extent to which the variation persists to very short time scales, we observed UX Cygni with the high speed pulse-counting photometer at the McDonald Observatory (3). The observations were obtained on the 76-cm reflector. The detector was a specially selected Amperex 56 DVP photomultiplier, operated uncooled and generally without a spectral filter.

The variable was observed with time resolutions between one and five seconds for a total of 12.5 hours on four nights. Table I gives the coverage times. Visual inspection of the data showed that no variations larger than 0.05 magnitude occurred on time scales less than two hours. Our data are not suitable for investigation of longer time scale variability, although we did observe a slow increase in brightness from night-to-night, consistent with the expected Mira-type variability.

On three nights, observations were made in V of the UBV system in order to determine the date of visual maximum. From these results (Table II) we estimate the date of maximum to have been 1972 Sep 18 \pm 4, which is in agreement with the AAVSO predicted date 1972 Sep 14 (4). The phases in Table II were computed using the observed date of maximum and the period of 561.24 days (5).

The bulk of our high speed observations refer to a time 19 \pm 4 days before maximum. This is very close to one of the phases at which rapid variations had been noted previously (2). Since we observed no rapid variability, we conclude that such variations are not strictly phase dependent and/or that following a rapid variation, perhaps during the intervals when we were not monitoring the star, the variable soon recovers to a high precision the brightness it had prior to the rapid event.

University of Texas at Austin
Austin, Texas 78712

THOMAS J. MOFFETT
THOMAS G. BARNES, III.

TABLE I

UT DATE	BEGIN (UT)	END (UT)	TOTAL COVERAGE
1972 Aug 29	03 ^h 44 ^m 46 ^s 04 41 02	04 ^h 02 ^m 01 ^s 09 05 52	04 ^h 42 ^m 05 ^s
1972 Aug 30	03 30 36 04 30 19 05 01 37 05 28 27 07 16 47 07 35 09	04 29 26 05 01 19 05 27 17 06 01 12 07 35 02 09 15 59	04 27 30
1972 Aug 31	03 07 38 03 21 29 04 38 36 05 46 32 07 39 09	03 10 33 03 35 24 05 45 16 06 23 37 08 58 09	03 19 35
1972 Sep 01	08 ^h 37 ^m 00 ^s	08 ^h 40 ^m 45 ^s	03 ^m 45 ^s

TABLE II

UT DATE	JD	V (mag)	PHASE
1972 Aug 29	2441558.5	11.27	0.97
1972 Oct 01	2441591.5	9.51	0.03
1972 Oct 16	2441606.5	9.98	0.05

References:

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