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PHOTOELECTRIC MINIMA OF SEVEN ECLIPSING BINARIES AND A SINGLE MAXIMUM OF BW VULPECULAE

We report herein photoelectric observations of seven eclipsing binaries and BW Vulpeculae made in 1975 and 1976 with the 40-cm Boller and Chivens f/18 Cassegrain telescope of the University of Montana. This telescope, located on 1980-meter Blue Mountain about six air miles southwest of the university campus, is equipped with an Astro Mechanics single-channel photometer containing an unrefrigerated EMI 6256B PM tube. The observations were made through a Corning 3384 V-band filter. The photomultiplier signal is fed through a DC amplifier to a voltage-to-frequency converter, whose output is integrated for ten seconds by an electronic counter. Three such integrations constitute a single observation. The observations were reduced by computer to produce extinction-corrected differential visual magnitudes (program star-comparison star) as a function of heliocentric Julian Date using the photometry reduction program of Walter Fitch (Steward Observatory). The heliocentric times of the observed minima were determined graphically by the chord bisection method. Table 1 lists the observed times of minimum and their probable errors, the epoch numbers E, and the O-C values. Table 2 gives the ephemerides used to calculate the O-C values.

Table 1. Observed Heliocentric Times of Minimum

Star	Hel. JD - 2,440,000	E	O-C
KO Aql	2637.8558 ± 0.0005	262	$+0^d.0085$
44 i Boo	2619.8345 ± 0.0015	10,333	+0.0025
RZ Cas	2633.7591 ± 0.0002	10,674	-0.0008
	2664.8340 ± 0.0001	10,700	-0.0023
	2670.8114 ± 0.0003	10,705	-0.0012
	3049.7003 ± 0.0008	11,022	-0.0056
TW Cas	2666.8395 ± 0.0014	461	-0.0047
	3096.7636 ± 0.0003	762	-0.0073
	3103.9140 ± 0.0004	767	+0.0014
DO Cas	2636.7778 ± 0.0003	12,722	+0.0003
	2664.8447 ± 0.0003	12,763	-0.0041
XX Cep	2663.7476 ± 0.0003	1866	+0.0062
AT Peg	2661.8070 ± 0.0006	1940	-0.0197

Table 2. Ephemerides for Eclipsing Binaries

Star	Heliocentric JD	Period (days)	Source
KO Aql	2,441,887.4714	2.86403	SAC 49
44 i Boo	2,439,852.4903	0.2678159	Dürbeck
RZ Cas	2,429,875.6902	1.1952473	Herczeg and Frieboes-Conde
TW Cas	2,442,008.3850	1.428328	SAC 49
DO Cas	2,433,926.4573	0.68466595	SAC 49
XX Cep	2,438,302.3209	2.33731	SAC 49
AT Peg	2,440,438.383	1.146105	SAC 49

Minima of AT Peg observed in 1974 and 1976 by Pohl and Kizilirmak (1974; 1976) also give negative O-C's, based on the ephemeris used here,

of -0.0041 and -0.0118, respectively, suggesting a possible decrease in the period of AT Peg of the order of $0^{d}.00001$ since 1969.

The observed maximum of BW Vul was found to occur at

Hel. JD (Max) = 2,443,060.6544 ± 0.0005.

The parabolic ephemeris equation derived by Valtier (1976) applied to the above time yields O-C = +0.0156 days, while the linear ephemeris equation of Tunca (1978) yields O-C = -0.0014 days.

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