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REVISED ELEMENTS AND CCD LIGHT CURVE FOR AU DRACONIS

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The variability of AU Draconis = BV 53 = GSC 4421.2005 (α_{J2000} : $17^h35^m21^s$; δ_{J2000} : $+68°38'18''$) was reported by Geyer et al. (1955). From photographic photometry, Tsessevitch (1956) deduced the elements

$$\mathrm{JD}(min, hel) = 2435635.397 + 0.51514 \times E \qquad (1)$$

with an EA type light curve. Tsessevitch's elements are given in the GCVS (Kholopov et al., 1985). The elements (1) are based on observations obtained within a short time span (85 days), yielding a rather uncertain value for the period. The only other source of information on AU Draconis consists of a few visually determined minima by Czech observers (Borovička et al., 1992).

We have observed this neglected star with an SBIG ST-7 camera attached to the 0.15 m refractor of our private observatory located at Wald, Switzerland. GSC 4421.1750 (GSC magnitude: 13.10) served as comparison star. This setup yields photometry at the $0\overset{m}{.}04$ level. A total of 215 CCD measurements (without a filter) during 7 nights from JD 2450770 to JD 2450902 have been obtained. Due to the proximity of the comparison star to AU Dra, no correction for differential extinction was applied to the data.

The elements (1) are not suitable for representing our observations adequately. We therefore subjected our data to a period searching routine. The best period value of P = $0\overset{d}{.}515267$ resulted from this study. Although the published times of minimum cover only three very small sections in time with large gaps in between and the cycle count numbers cannot be determined with certainty, all the known minima can be represented within the errors of the data by elements using a period value virtually identical to the one found with the period search routine, namely

$$\mathrm{JD}(min, hel) = 2450770.3112(10) + 0.51526673(13) \times E. \qquad (2)$$

In Figure 1, we show all our CCD data folded with the elements (2). The O−C values for the available times of minimum are given in Table 1, where the earlier timings from photographic and visual photometry have been reduced to seasonal mean values.

AU Draconis shows the light curve of a close binary of the EB type with some asymmetry in both minima. The primary minimum is $0\overset{m}{.}7$ deep ($11\overset{m}{.}3$ - $12\overset{m}{.}0$) while the secondary has an amplitude of $0\overset{m}{.}3$. The secondary occurs at phase $0\overset{p}{.}5$.

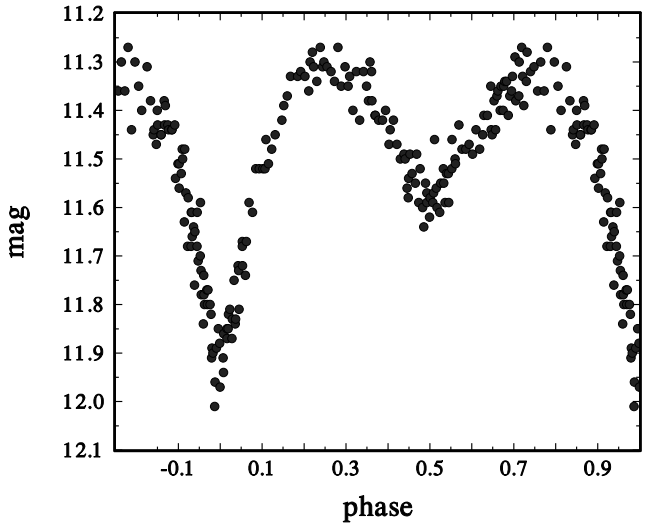

Figure 1. CCD light curve (without filter) of AU Dra folded with the elements (2)

Table 1. O−C values of the observed minima of AU Dra based on the elements (2)

JD(hel)	e.e.	E	O−C	Mode	Reference
2435699.275		−29249.0	0.000	pg	Tsessevitch (1956)
2447706.536	0.003	−5946.0	+0.001	vis	Borovička et al. (1992)
2450599.496	0.005	−331.5	−0.004	CCD	Diethelm (1998)
2450710.284	0.002	−116.5	+0.001	CCD	Blättler (1998)
2450770.311	0.003	0.0	0.000	CCD	Blättler (1998)
2450774.434	0.002	8.0	+0.001	CCD	Blättler (1998)
2450778.297	0.002	15.5	−0.001	CCD	Blättler (1998)
2450822.3520	0.0011	101.0	−0.0011	CCD	Blättler (1998)
2450823.6397	0.0002	103.5	−0.0016	CCD	Blättler (1998)

This research made use of the SIMBAD data base operated by the CDS, Strasbourg, France.

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