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CCD PHOTOMETRY OF T UMi

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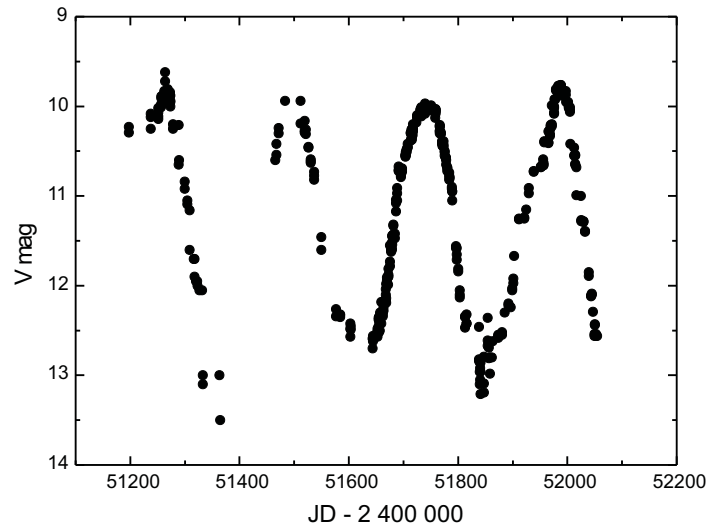
T Ursae Minoris (= GSC 04408 00163 = HD 118556;  $\alpha = 13^{\text{h}}34^{\text{m}}41.09^{\text{s}}$ ,  $\delta = 73^{\circ}25'53.10''$  [J2000]) is a Mira type star, with spectral type varying between M4e and M6e and with range of optical light variations between visual magnitudes 7.8 and 15.0. In the fourth edition of the GCVS (Kholopov et al., 1985) a period of 301 days is given for its light variations. Detailed analysis of its light curve came out in papers of Gál and Szatmáry (1995) and Mattei and Foster (1995). Gál and Szatmáry (1995) showed that the period of T UMi is strongly decreasing: between JD 2440000 and JD 2449250 the period dropped from 314.5 days to 283.2 days. They attributed this change to a change of luminosity due to a shell flash in the helium burning shell. The period was constant before JD 2440000 suggesting that T UMi is just after the beginning of the shell flash. Using calculations of Wood and Zarro (1981), Gál and Szatmáry (1995) suggested that the period will start increasing again in few decades.

CCD photometry of T UMi has been done at Valašské Meziříčí observatory between 1999 January and 2001 May using astrocamera ZEISS 120/540 mm with attached SBIG ST-7 CCD camera and *V* filter. CCDOPS software bundled with SBIG cameras was used for photometry. GSC 4408 01074 (= PPM 8412 = SAO 7813 = BD +74 540; *V* = 9.28 mag, *B* – *V* = 0.93 mag) was used as the comparison star. A total of 456 measurements has been obtained in the course of 4 cycle. Measurements have typical errors of about 0.03 mag. Four maxima timings could be determined using the Kwee and von Woerden (1956) method implemented in AVE (Barbera, 2000) and their values are given in Table 1. The light curve of T UMi is shown in Figure 1. Observations can be retrieved through IBVS website (5323-t2.txt).

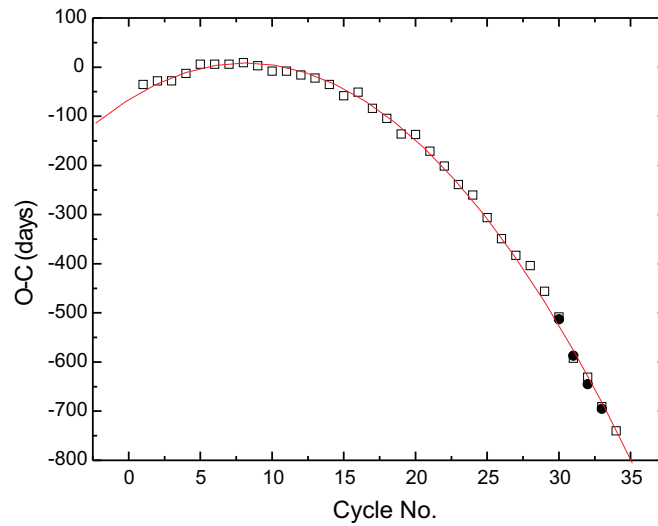
An *O* – *C* diagram of maxima timings of T UMi based on data from AFOEV database and observations from Table 1 is presented in Figure 2. Changes of the length of the period (distances of subsequent maxima) are plotted in Figure 3. The fitted line corresponds to the period decrease of 2.3 days/cycle. The period used for construction of Figure 2 was taken from GCVS (301 d) and JD 2443052 was used as the basic maximum.

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The author is thankful to Ondřej Pejcha for help with preparation of figures.



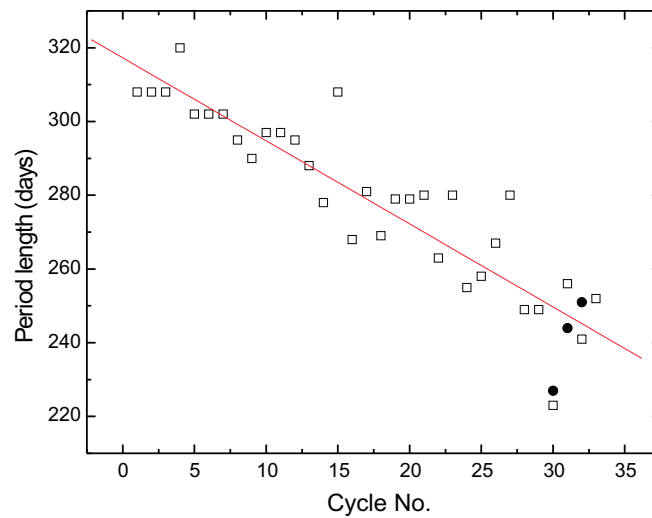
**Figure 1.** Light curve of T UMi.



**Figure 2.**  $O - C$  diagram of maxima timings of T UMi based on data from the AFOEV database (maxima 1-34; open squares) and from observations from this paper (maxima 30-33; solid circles). The solid curve is a quadratic fit to the data.

Table 1: Maxima timings of T UMi.

Geo. JD	Error	Filter	Maxima	$O - C$
2451267.8	0.5	<i>V</i>	30	-513
2451494.5	1.3	<i>V</i>	31	-587
2451738.4	0.3	<i>V</i>	32	-645
2451989.5	0.2	<i>V</i>	33	-695



**Figure 3.** Evolution of the length of the period. Symbols are same as in Figure 2. The solid line corresponds to period decrease of 2.3 days/cycle.

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