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TZ BOOTIS' 1980 LIGHT CURVE

The W UMa system TZ Bootis is one of the most observed eclipsing binaries during the last decade. It could be shown that this star has an extraordinary variable light curve even for W type W UMa systems. Observations up to the middle of 1979 show repetitive interchanges of the minima depths with a period of about 3.5 years (Hoffmann, 1978, 1980). Just because of the frequent measurements of the last years a dense patrol of the subsequent light curve behaviour is of importance. Only then the development and nature of the 3.5y period can be revealed. For that reason further measurements of TZ Boo have been made on November 22, 1979, and May 12 and 13, 1980. They have been carried out in B and V with the 106cm Cassegrain telescope of Hoher List Observatory and a two channel photometer. Period, phase and geographic position permitted the measurement of the two different minima depths in November, although TZ Boo is then in conjunction with the sun at a separation of only 60° . The occultation minimum was then $0^m.06$ fainter (B) than the transit minimum. In May, a complete light curve could be obtained (Figures 1 and 2). This light curve has a quite regular appearance with only a small O'Connell-effect. Smaller "complications" are visible at several phases, for instance the sloped transit minimum. The amplitude of the light curve is moderately small ($0^m.38$; 1978: $0^m.51$, 1979: $0^m.34$ (B)). The regularity of the light curve is also demonstrated by the coefficients of the Fourier series of the outside eclipse measurements:

$$\begin{aligned} B \quad \ell &= 0.897 - 0.012 \cos \varphi - 0.097 \cos 2\varphi \\ &\quad + 0.006 \sin \varphi - 0.007 \sin 2\varphi \\ V \quad \ell &= 0.913 + 0.006 \cos \varphi - 0.093 \cos 2\varphi \\ &\quad - 0.002 \sin \varphi - 0.005 \sin 2\varphi \end{aligned}$$

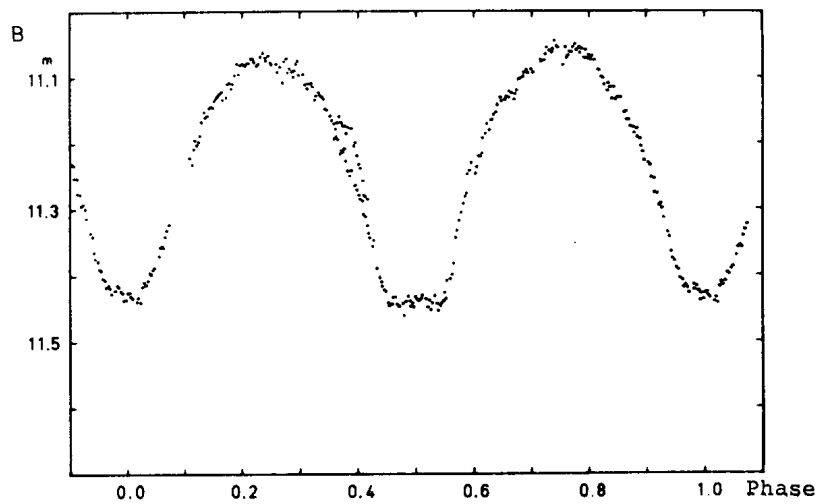


Figure 1. May 1980 light curve of TZ Boo. Colour B.

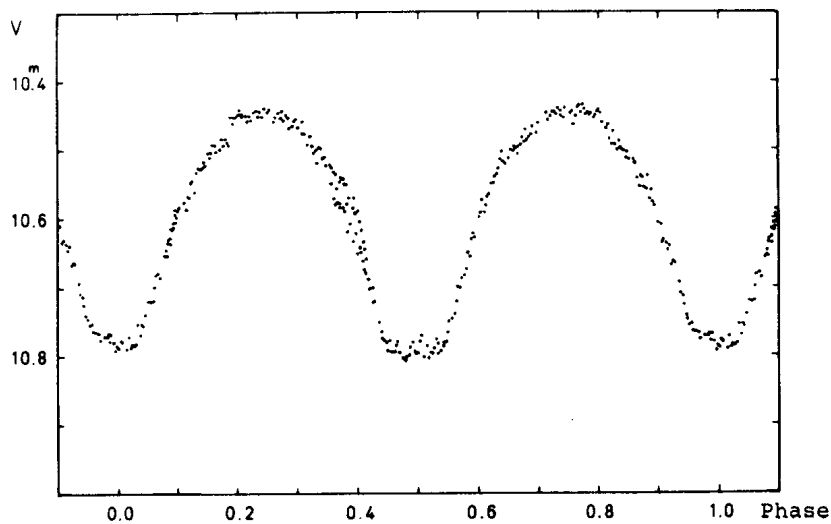


Figure 2. May 1980 light curve of TZ Boo. Colour V.

The sine coefficients are obviously small as well as the first cosine term, the latter indicating a small reflection effect.

Minima times of TZ Bootis have been determined:

Transit	JD 2444372.5710
Occultation	JD 2444372.4211

With the mean period of the last decade, $P=0^d2971620$, these

minima are $0^d.005$ early. If this means a spurious period fluctuation can only be decided by subsequent observations. The difference of the minima depths in May 1980 is only $0^m.01$, the occultation being fainter. This means that TZ Boo is already on the way again to deeper transit minima. There is no difference in B-V at the minima, but the maximum following occultation is markedly bluer than the other one. A temperature difference of the "side" hemispheres can be claimed therefore. The reductions have partly been carried out with a calculator granted by the Deutsche Forschungsgemeinschaft (Schm 167/12). This shall be gratefully acknowledged.

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