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FLARE STAR OBSERVATIONS IN ORION BY THE METHOD OF
PHOTOGRAPHIC STELLAR TRACKS

The purpose of our study was the application of the method of photographic stellar tracks (Chavushian, 1986) at the National Astronomical Observatory, Rozhen, Bulgaria. The stellar aggregate Orion (M 42) was chosen for its relatively high flare activity.

The observations were carried out in the period 1 November - 3 December, 1986 with the 50/70/172 cm Schmidt telescope of the Rozhen Observatory using ORWO ZU 21 plates without filter, and exposure time of 30 minutes. The average limit of the plates was $15^m.2$ (pg). The effective observational time was 13 hours. The plates were analysed with a Carl Zeiss Jena blink-comparator (16 x magnification, then the detected events were measured with a G2 schnell photometer.

After surveying the material, 3 flares were found. The data obtained are listed in Table I. The successive columns of the table contain the following data:

- 1.- the serial number of the event
- 2.- other designations
- 3.- the date of observation
- 4-6.- U.T. of the beginning of the flare ($U.T._b$), U.T. of the maximum ($U.T._{max}$) and the duration
- 7.- the magnitude in the quiet state and the amplitude Δm_{pg} during the flare
- 8.- the standard deviation of random noise fluctuations $\sigma(\text{mag})$.

We used photometric sequence No. 2 in Orion according to Andrews (1970) for our photometry.

Flare event No. 1 took place in the star Tonantzintla No. 26. This is the second flare observed in this star. The first was observed on 15 December 1963 with an amplitude $\Delta m_U = 2^m.0$ by the multiexposure method (Haro and Chavira, 1964).

Flare event No. 2 was observed in the In type variable star PZ Ori.

Table I

No.	Other design.	Date	U.T. begin.	U.T. max	Dura- tion	m_{pg} min?	m_{pg} max?	σ (mag)
1.	T 26	1 Dec. 1986	2 ^h 12 ^m 06 ^s	2 ^h 15 ^m 35 ^s	3 ^m 36 ^s	17.7	3.8	0.15
2.	PZ Ori	1 Dec. 1986	1 49 36	1 51 45	3 13	14.6	1.2	0.15
3.	Anon	2 Dec. 1986	1 45 07	1 48 41	~10	21.5	6.7	0.10

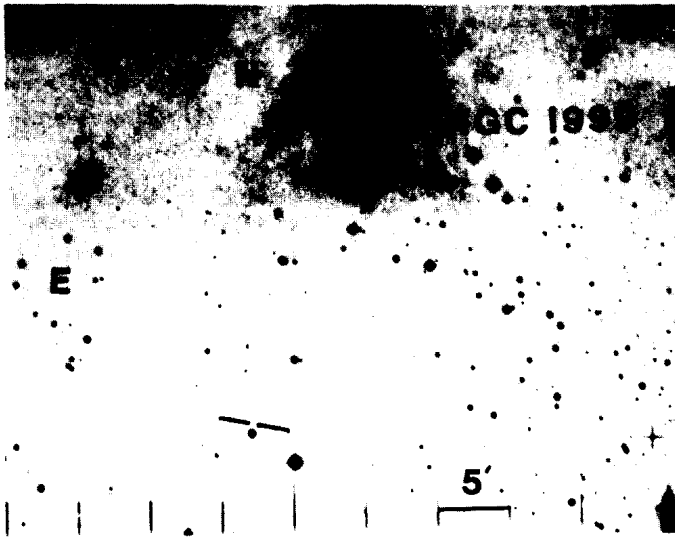


Figure 1

This flare was observed when the star was in a state of increased activity. Usually, this star is near the plate limit on our plates (m_{pg} limit=15.2) but in the period 2-10 November the star increased its brightness to m_{pg} =14.6 and remained with this magnitude up to the end of our observations. In the General Catalogue of Variable Stars (Kholopov et al., 1985) it is mentioned that this star has m_{pgmin} =15.7. PZ Ori is unknown as a star exhibiting flares.

Flare event No. 3 belongs to a very faint star which has not been known to be variable. On the chart No. J-3828 from the U.K.S.T.U. Atlas of the Royal Observatory, Edinburgh, we identified this event with a star of $m_B \approx 21.5$. The

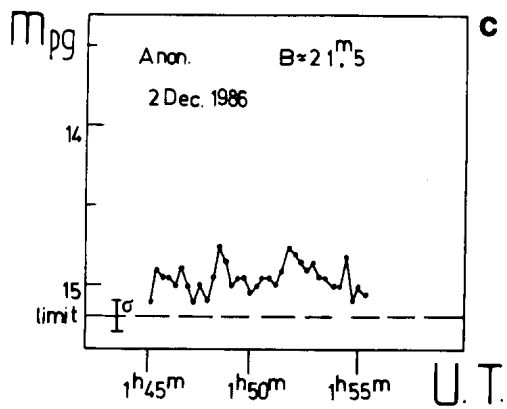
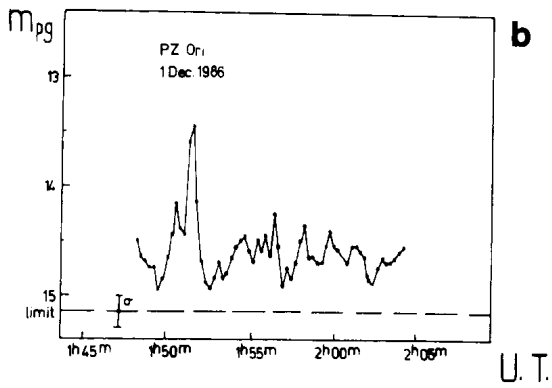
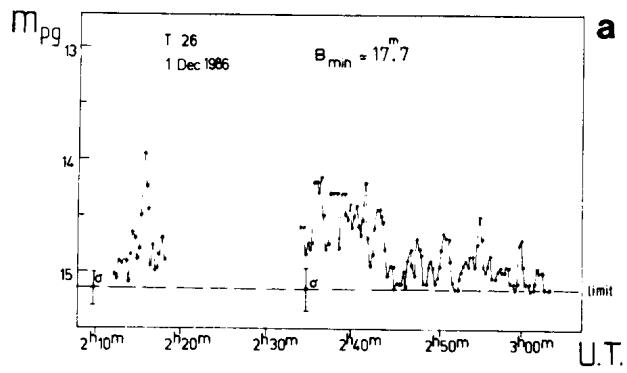


Figure 2

identification chart is given in Figure 1. The coordinates of the star are
 $R.A._{1950.0} = 5^h 34^m 05^s$, $D_{1950.0} = -7^{\circ} 01.3$.

The light curves of the observed flares are given in Figure 2.

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