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OBSERVATIONS OF SU UMa BEFORE AND DURING A SUPEROUTBURST +

SU UMa stars have recently been defined by Vogt (1980) as dwarf novae that show two distinct properties: short and long lasting eruptions (superoutbursts) and periodic light variations (superhumps) during a superoutburst. The prototype SU UMa itself, though beeing fairly bright, apparently was never observed in detail during a superoutburst. Therefore its membership to this subgroup of dwarf novae still needs to be confirmed.

SU UMa was observed with a 2-channel highspeed photometer attached to the 1.23 m telescope of the Calar Alto Observatory in Spain (Table I gives the observational data). During two nights the object was measured in minimum light, during the third night SU UMa was in outburst (Barwig et al., 1980). Using data from the AAVSO (1981) it could be confirmed that the star started a superoutburst just before our last run. A lightcurve of this eruption, derived from the AAVSO data, is shown in Fig. 1.

To demonstrate the short time variations in the lightcurve, two examples of our measurements in minimum and maximum light are shown in Fig.2 and 3 respectively. The amplitude of the flickering in minimum light is comparable to that of WX Hyi and V436 Cen and increases in intensity by a factor of two during outburst. No pronounced periodic features were found which could be attributed to orbital motion, but an analysis of periodic

+Based on observations collected at the MPIA Heidelberg Observatory, Calar Alto, Spain.

variations in our measurements before the outburst yielded a period of 120 min ± 10% with a relative amplitude of a few percent and a significance of 3 - 4σ. Interpreted as an orbital phenomenon SU UMa would belong to the long period members of this special group. The chance, however, that this result is accidentally is large.

Periodogram and autocorrelation function revealed a period of 13 min, which is most clearly seen in channel R of run 2 (Fig.4) and less pronounced in run 3. Similar periodic variations have already been reported by Mumford (1964).

Table I

Date	Run No.	Start HJD 2444300+	End	
1980-03-10/11	1	09.570	09.694	Wavelength region:
1980-03-12/13	2	11.529	11.694	Channel B : λ_{eff} = 400 nm
1980-03-15/16	3	14.331	14.626	Channel R : λ_{eff} = 590 nm
				Integration time: 3 s

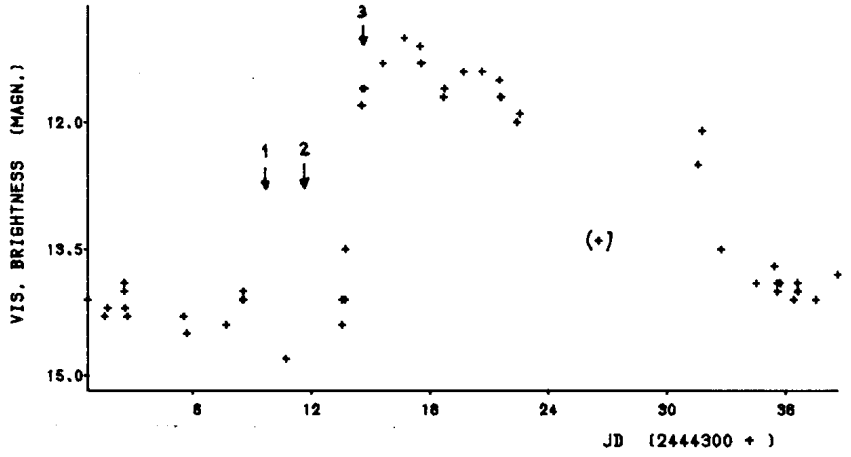

Fig.1 Lightcurve of SU UMa from AAVSO (1980, Mar.2 - Apr.6). The times of our runs are indicated by arrows 1 - 3. The point in brackets means: "fainter than".

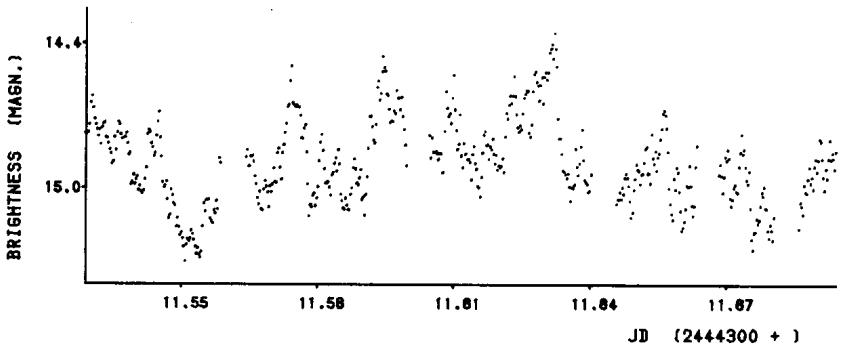

Fig.2 Photometry of SU UMa in minimum light (run 2, channel B)

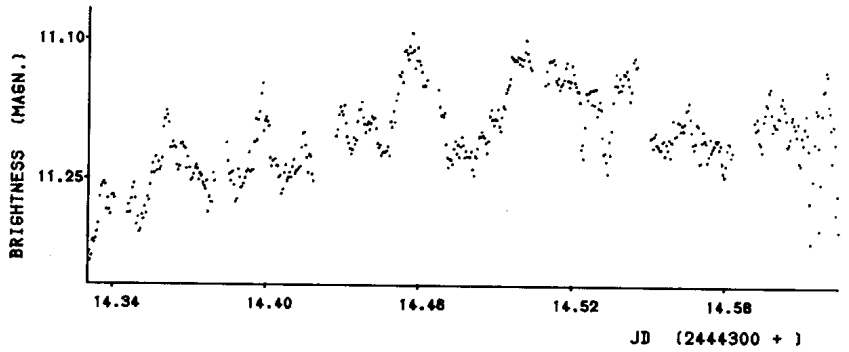

Fig.3 Photometry of SU UMa during superoutburst (run3,chan.B)

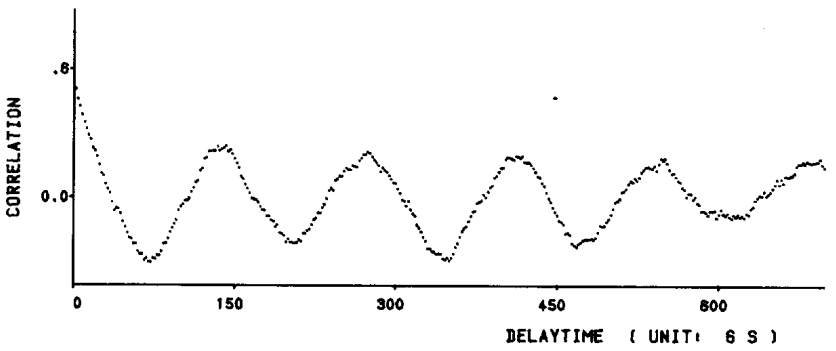

Fig.4 Autocorrelation function of SU UMa (run 2, channel R)

It is important to know whether SU UMa exhibits superhumps or not.
According to the AAVSO data our last run covers the time interval between 15 and 22 hours after start of eruption (T_o). As can be seen in Fig. 3, during that time the brightness of the star increased by less than 0.1^m if one disregards light changes due to flickering. A similar result can be derived from AAVSO data received near the time of our measurements: 4 out of 6 values indicate constant luminosity (11.6^m). That means, the brightness of SU UMa reached a standstill at the time of our observations.

A thorough investigation of our data by means of normal periodogram technique did not reveal any periodic features with significant amplitudes for any superhumps. The AAVSO data from the time interval between 2 and 6 days after T_o clearly show a further increase in brightness. With regard to the small sample and large scatter in these data, periodic light variations cannot be excluded but cannot be proved either.

In other SU UMa stars superhumps evolved one or two days after beginning of outburst. Marino et al. (1979) and Vogt (1981) already proposed that each superoutburst starts with a normal eruption, and after a short standstill the characteristic supermaximum emerges.

Under this respect it may still be possible that SU UMa is the prototype of its group.

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