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PHOTOMETRIC STUDY OF THE BLUE VARIABLES IW, IZ AND IO ANDROMEDAE

The stars discovered by Meinunger (1975) were investigated on 330 plates of Sonneberg collection obtained in JD 2440802-46706.

IW And (=S 10792; all variable star designations are according to Kholopov et al., 1985). A part of the light curve was published by Meinunger (1975). The spectrum is similar to that of OB stars, but with some peculiarities (Meinunger, 1980). Further observations also show the rapid brightness variations, up to 3 magn. in 1^d. However, it seems to be, that the typical state of the star is the inactive state (72% of observations are in interval 15.1^m-15.3^m), which occasionally is being interrupted by maximum brightness (18% in the interval 13.7^m-15.0^m) and minimum brightness (10% in the interval 15.4^m-17.3^m) states lasting some tens of days. These extrema can be regarded as "active states", and practically in all our observations the bright states are accompanied by states of low brightness and vice versa.
Such behaviour differs significantly from that of dwarf novae (eg. Richter, 1986 and references therein) or polars (Hudec and Meinunger, 1976).The light curve is, however, similar to that of KR Aurigae, which is probably a single black hole that accretes matter from interstellar medium (Popova and Vitrichenko, 1978). Another possible explanation of such variability might be connected with a mechanism of radiation-induced outflow from the secondary star in a binary system (Basko and Sunyaev, 1973, King and Lasota, 1984). In order to answer the question which mechanism takes place in this object, multiwavelength photometric and spectral observations are needed. The object might be an X-ray source.

IZ And (=S 10794). Also rediscovered by Stepanian (1982). Only five outburts have been observed, which are listed in Table I.

Table I

JD 24.....	m	n	Reference
41300	15.9	2	Meinunger (1975)
41366	15.4	5	-"-
41975	17.5	1	Stepanian (1982)
42231	15.5	1	-"-
44466	16.3	1	this paper

In Table I n is the number of nights, during which the given outburst was observed. The shortest time interval between the outbursts is $C=66^d$. If we assume the outburst duration (time, during which the star is brighter than 17^m) $L=8^d$ (JD 2441366-74), then, according to Wenzel and Richter (1986), the cycle length is $C_2=LN/n \sim 86^d$. Here N = 107 is the total number of nights, n = 10 - the number of nights, at which the star was bright. It is in good agreement with the value C. However, if we use the value of N instead of T (see Wenzel and Richter 1986 for details), we obtain a sufficiently lower value of $C_1=17^d$ (g=2, λ =1.594). It is self-evident, because N is only a lower limit of T, but this value of time of "potentially possible observations" might not be counted with sufficient accuracy.

Using the value of C, we obtain the same values $A=4.1^m$ for "Amplitude-cycle length" relationships both by Kholopov and Efremov (1976) and by Richter (1986). It is in good agreement with the observations (4.9^m according to Meinunger (1975); but the lower limit 20.5^m is very uncertain, more probable is a value of $\sim 1^m$ brighter, as given by Stepanian (1982).

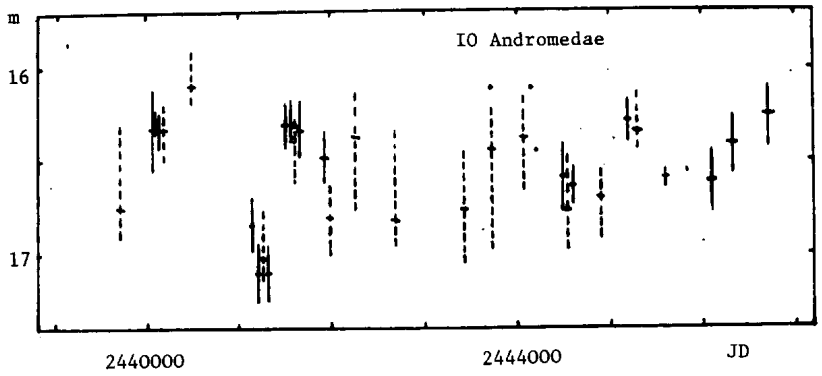

Figure 1 The mean light curve of IO Andromedae from Sonneberg (solid line error bar) and Moscow (broken line) observations. All observations have been reduced to Meinunger's (1975) scale

IO And(=S 10785). The star is supposed to be a polar, However, no emission lines were present in spectra (Meinunger, 1980). The 5-year cyclic variation of the star was suspected from 650 observations from Moscow plate collection (Andronov, 1983). The changes are cyclic but not periodic, as seen from the comparison with 324 Sonneberg observations (Fig. 1). Possibly the object is a quasar (Voykhanskaya, 1987), but not a polar. Its behaviour has some similarities with that observed in other quasars (Kurochkin, 1978). The correct classification is, however, not possible by using only photometric observations.

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