LIGHT CURVE VARIATIONS OF THE MAGNETIC CATACLYSMIC BINARY MR SERPENTIS : PHOTOMETRIC PERIOD IS NOT AS SURE AS BELIEVED

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ABSTRACT. The light curves show very large even for polars night–to–night variability of the amplitudes (from 0.4^m to 1.6^m) and shapes. The flares may be owed not only to the inhomogeneous accretion, but possibly some to the UV–Cet events. Large scatter of the phases does not allow to fit all observations even with one period, arguing for future monitoring.

Key words: Stars: Polars: MR Ser.

MR Ser (=PG 1550+191) was classified as an AM Her–type star by Liebert et al. (1982). Unfortunately, since that time no serious attention was paid to this very interesting object, despite it behaves very exotically.

The observations obtained in 1982–1991 yrs. (Andronov et al., 1992) showed extreme variations of the shape of the light curve similar to that detected in AM Her itself (Andronov et al., 1980). From 6 runs of observations obtained in 1991 in R the following best fit elements were obtained for MR Ser:

$$\text{Min HJD} = 2448446.7284(\pm 0.0015) + \\ + 0.078795(\pm 0.000012)\cdot E.$$

This period's value is close to the spectral one of $0.07879793^d(8)$ by Schwope et al. (1993), but differs from a previously published one 0.0788709^d Szkody 1988) by 7σ. It is not possible to fit all the times obtained in 1981–1991 by the same period. Alltogether 27 minima were collected by Andronov et al. (1992). The phase changes have the large amplitude up to $0.4P$. This phenomenon may arise due to drastic changes in the accretion geometry, despite the cycle number miscount may not be ruled out. The minima systematically occur later at longer wavelengths.

New observations were obtained at the same 50–cm telescope MTM–500 equipped by a TV detector (see Prokof'eva et al. 1993 for description) with time resolution 2.5 min in the instrumental R system (4 runs) and without filter (8 runs). They show a wide variety of types of the light curve variability (Fig. 1,2). The amplitude varied from 0.4^m to 1.6^m. At some light curves the photometric waves were significantly longer than the period. The short– and long (up to 0.25–0.5P) minima were sometimes observed. Many of the curves were distorted by irregular brightenings with an amplitude of $0.2 - 0.6^m$ and timescales from 10 to 30 minutes. Similar to AM Her, the majority of the flares may be explained by accretion events, but few of them (e.g. HJD 2449186.45, 9187.32) resemble in a mild form the unprecedented UV Cet–like flare in the red dwarf in the AM Her system (Shakhovskoy et al. 1993).

Impossibility to fit all the minima by the same period may not be caused only by physical cycle–to–cycle variations of the light curve. Another explanation is secular variation of the photometric period. This means that MR Ser may not be a "true" polar with a magnetic white dwarf *synchronously* rotating with orbital motion, but is at the stage of *"synchronization"* (Andronov 1987) similar to V 1500 Cyg (Schmidt and Stockman 1991; Pavlenko and Pelt 1991) and BY Cam (Mason et al. 1994). However, to test this hypothesis, new regular multicolor observations (or at least in R where they are more pronounced) are needed with a baseline of at least few years.

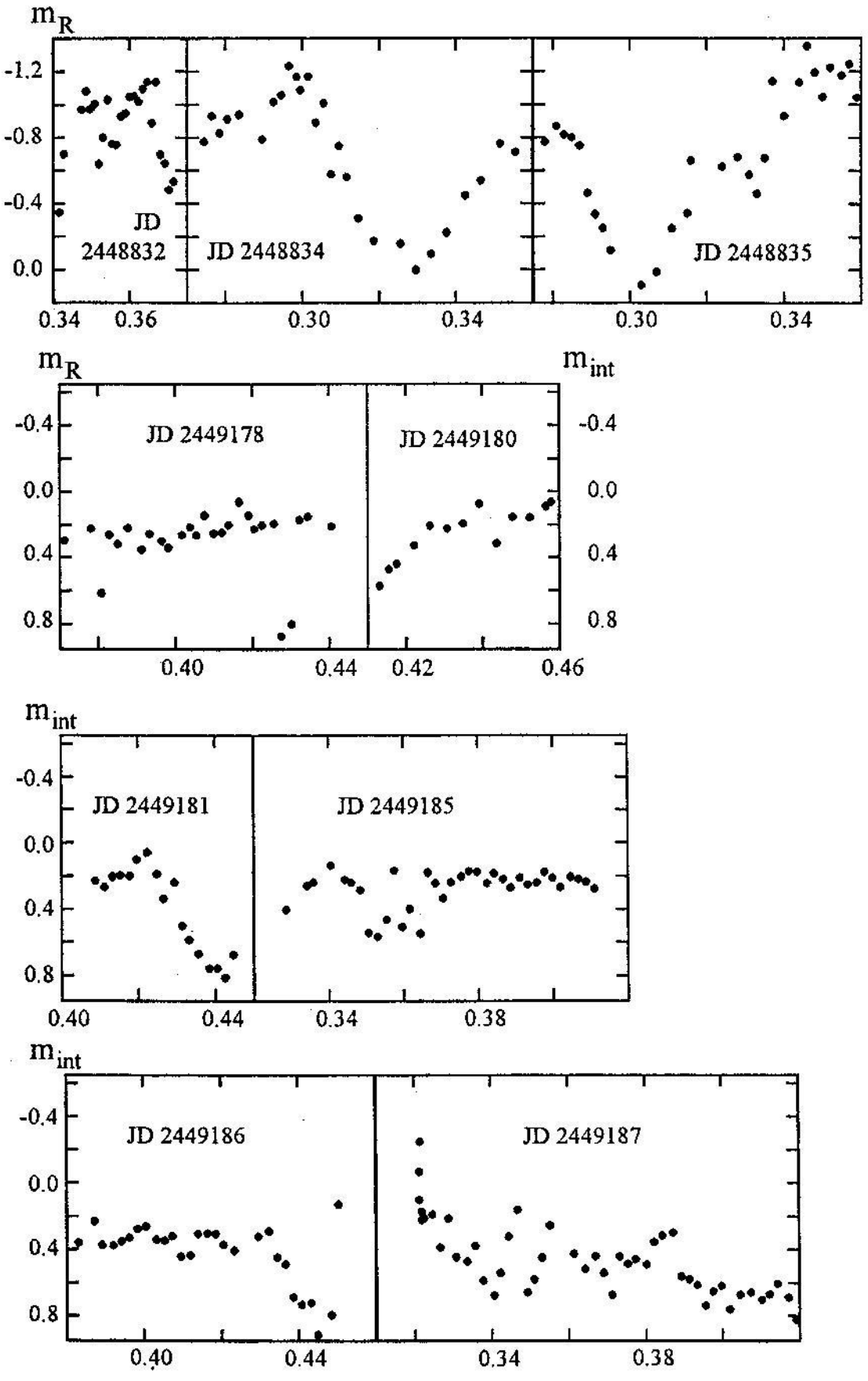
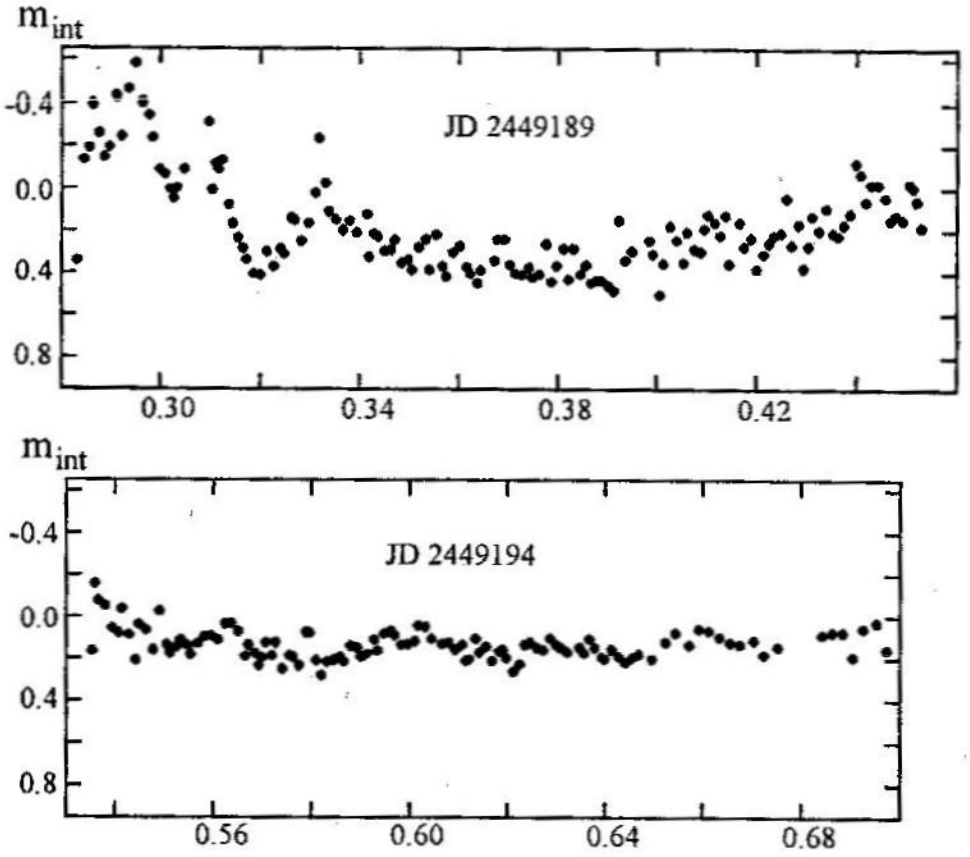


Figure 1. Light curves of MR Ser.



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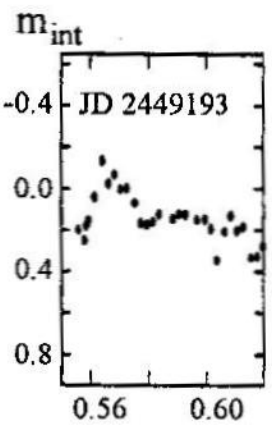

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