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RX Cha: NEW LONG-PERIOD SU UMa-TYPE DWARF NOVA

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RX Cha is a little studied, faint dwarf nova. Vogt and Bateson (1982) provided a likely identification with a faint blue star on SRC plates. Bruch et al. (1992) provided astrometry of the likely quiescent counterpart. Two attempts have been made to spectroscopically identify the object in quiescence (Zwitter and Munari 1996; Munari and Zwitter 1998), but no spectroscopic information was obtained due to the faintness of the object. Zwitter and Munari (1996) gave an upper limit of $V = 20.5$ for the quiescent counterpart. The large outburst amplitude (> 6 mag) made RX Cha as a good candidate for an SU UMa-type dwarf nova. The object has been regularly monitored by visual observers, and several outbursts have been recorded.

Visual observations were done by using 32-cm (R.S.), 40-cm (A.P.) and 32-cm (P.N.) reflectors. All observations were done using photoelectrically calibrated V-magnitude comparison stars. The typical error of visual estimates was less than $0\overset{\mathrm{m}}{.}2$ mag, which does not affect the following discussion. During the 1998 September outburst, time-resolved CCD photometry and astrometry were performed by one of the authors (G.G.), with an unfiltered AP-7 CCD attached to a 45-cm reflector. The exposure time was 60 s. A total of 216 CCD frames were taken between BJD 2451073.077 and 2451073.232. Table 1 lists the observed outbursts since 1998 January.

Figure 1 shows the CCD light curve on 1998 September 16. The magnitudes are given relative to GSC 9405.598 (Tycho-2 magnitude $V = 11.63 \pm 0.13$, $B - V = +1.15 \pm 0.31$), whose constancy during the run was confirmed using the check star GSC 9405.1400 (Tycho-2 magnitude $V = 12.11 \pm 0.18$). The light curve shows two superhumps with an amplitude of 0.15–0.20 mag. The period analysis was done using the Phase Dispersion Minimization (PDM) method (Stellingwerf 1978). The resultant theta diagram is shown in Figure 2. The best superhump period is determined as 0.0839 ± 0.0020 d. However, the apparently changing amplitude of superhumps may have slightly affected the result of the analysis.

The CCD observation during the 1998 September outburst has confirmed that RX Cha is an SU UMa-type dwarf nova. The resultant superhump period of $0\overset{\mathrm{d}}{.}084$ makes RX Cha an SU UMa-type dwarf nova with a long orbital period (P_{orb}). Astrometry using

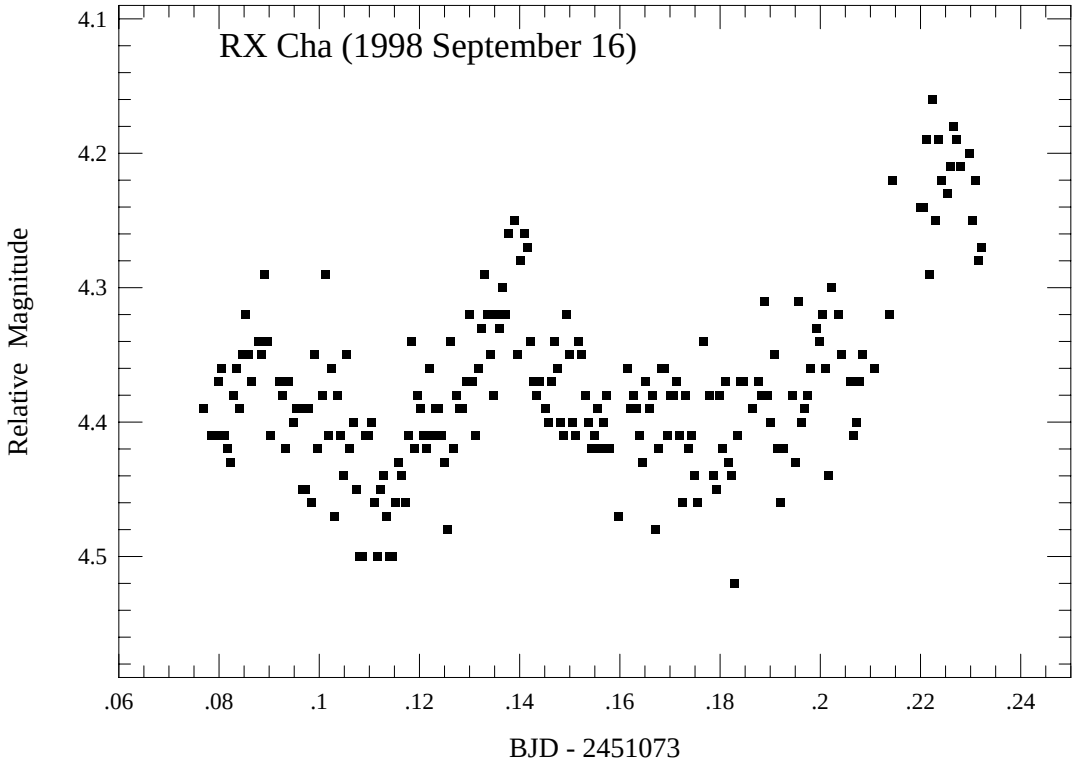

Figure 1. Light curve of RX Cha on 1998 September 16

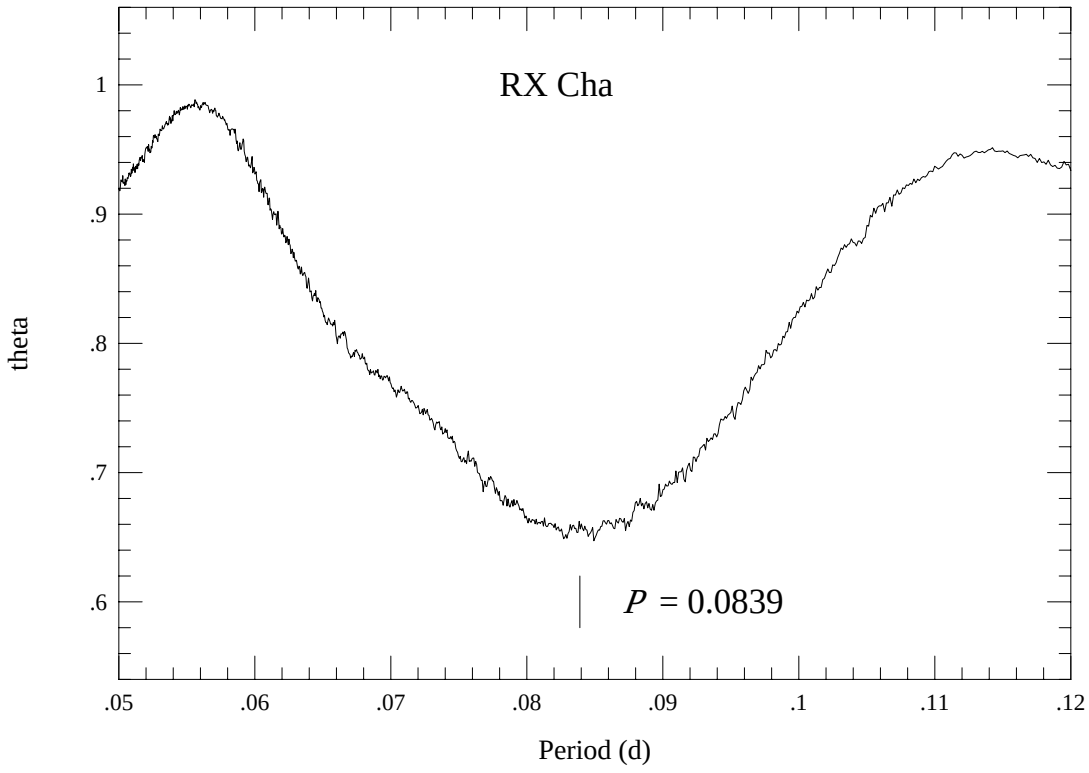

Figure 2. Periodogram of RX Cha

Table 1: Outbursts of RX Cha

JD start	peak magnitude	duration (d)
2450831	14.5	—
2451066	14.4	> 8
2451544	14.4	> 8
2451982	14.3	> 9

80 GSC stars has yield the following accurate position (mean residual $0\farcs4$): $10^{\rm h}36^{\rm m}26\fs33$, $-80^\circ02'48\farcs2$ (J2000.0). This confirms the identification by Vogt and Bateson (1982), and the inferred large outburst amplitude of > 6 mag.

Some of the long orbital period SU UMa-type dwarf novae, such as YZ Cnc and SS UMi, tend to have a high outburst frequency. The low number of detected outbursts (Table 1) clearly suggests that outbursts are relatively rare in this system. All detected outbursts, except the first one, have long durations and are identified as superoutbursts. The first one was not well covered by observations, but the brightness may also suggest a superoutburst. The supercycle is thus ~ 460 d, if the first outburst is a normal one, or its half, ~ 230 d, if the first outburst is a superoutburst. The lack of detections of definite normal outbursts between well-observed superoutbursts may have been a result of the faintness of the object, but is more likely to directly reflect the low number of normal outbursts. Such a low number ratio of (normal outbursts)/(superoutbursts) is a common property in SU UMa-type dwarf novae with low outburst frequencies. However, such systems are known to be rare among long $P_{\rm orb}$ systems. Only a few systems are known to show similar properties: EF Peg (Matsumoto et al., in preparation), V725 Aql (Uemura et al. 2001) and DV UMa (e.g. Nogami et al. 2001). Since these systems play an important role in understanding the evolution of dwarf novae, and the origin of mass-transfer, further detailed observations of RX Cha are highly encouraged.

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