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BVRI AND SPECTROSCOPIC OBSERVATIONS OF SY Cnc

SY Cnc (α (J2000)= $9^{\text{h}}1^{\text{m}}34^{\text{s}}.1$; δ (J2000)= $17^{\circ}53'55''.1$) is one of the brightest dwarf novae of Z Cam subtype. The visual magnitude varies between 10.8-11.1 at maximum and 13.5-14.5 at minimum with mean time between outbursts of 27 days (GCVS).

Many visual observations of SY Cnc have been reported in literature but continuous BVRI observations during a complete excursion from maximum to minimum are rare.

We observed photometrically the star with the 0.40 m automatic telescope at Astronomical Observatory of Perugia from 1993.02.03 to 1993.03.30. The telescope was equipped with a CCD camera and BVRI filters of Cousins. The instrumental magnitudes were transformed into the standard system observing equatorial Landolt's stars.

Spectroscopic observations were also obtained during an observational run at the 1.82 m telescope of the Asiago Astrophysical Observatory. The spectrograph used was a Boller and Chivens + CCD with 300 lines/mm grating ($\sim 4 \text{ \AA}/\text{pixel}$). A hollow cathode Fe-Ar lamp was used for wavelength calibration.

Figure 1 shows the spectrum of SY Cnc from 4000 to 8000 \AA . This spectrum is a combination of three exposures with different inclinations of grating. It was taken on 1993.03.15 (J.D. 2449062.3) when the star was in the initial phase of decline from the outburst. The Balmer series is in emission with the intensity of single lines decreasing from H α to H δ ; there are also some lines of HeI weakly in emission $\lambda=6678 \text{ \AA}$ and $\lambda=7065 \text{ \AA}$) and the line $\lambda=4686 \text{ \AA}$ of HeII is in emission too. All identified lines are strongly redshifted. The spectrum is typically of a dwarf nova in outburst as we can see from the comparison with spectra taken by Williams (1983).

Table 1 lists the dates of photometric observations, magnitudes and standard deviations. A series of exposures with BVRI filters last ~ 20 minutes and we have reported the mean Julian Date. Care must be taken using color indices because this object exhibits flickering of about 0.1 mag on time scales of minutes (Pezzuto et al., 1992) and the observations are not simultaneous.

In Figure 2 are drawn the BVRI light curves during the decline from an outburst probably verified on 1993 March 10/11 (Bulletin de l'AFOEV No.65). The amplitude of variation from maximum to minimum decreases from B to I: in the B filter SY Cnc varies of ≈ 2.5 magnitudes while in the I filter ≈ 1.5 magnitudes. Theoretical models of CVs predict an accretion disk emitting a continuum spectrum of type $F(\nu) \propto \nu^{\alpha}$ with $\alpha=0.33$.

From our BVRI data, transformed in flux using the relations reported in Bessel (1979), we have calculated a variation of spectral index α from $\cong 0.6$ (at observed maximum) to $\cong -0.08$ (at observed minimum). This behaviour may be explained considering the relative importance of the disk emission and white dwarf emission at the maximum, and the secondary star (classified as G8/9 V (Ritter 1990)) and the bright spot emission at the minimum.

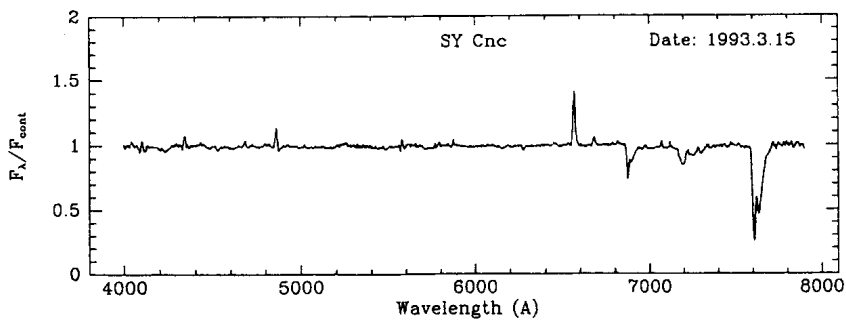


Figure 1

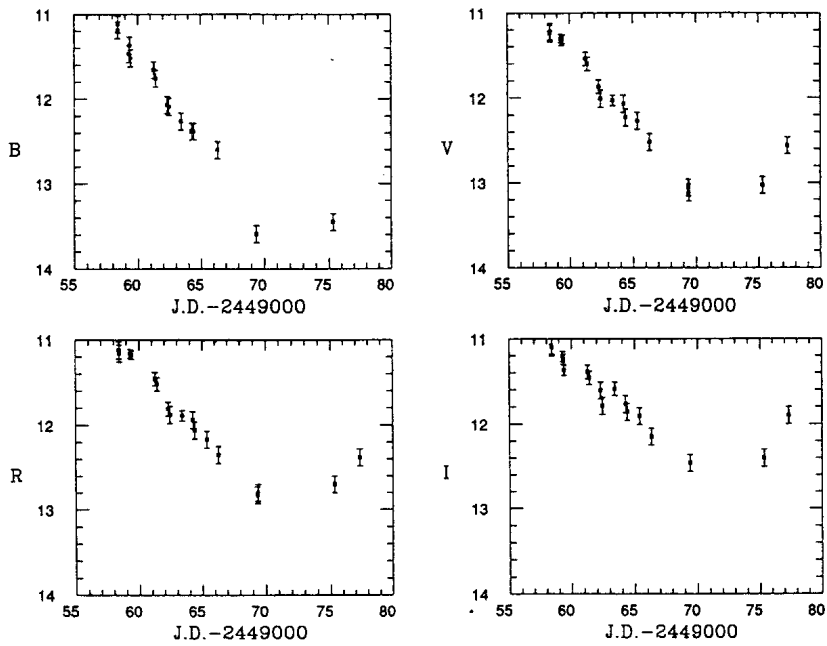


Figure 2

Table I

J.D. (2449000+)	B	V	R	I
22.385	13.26 ±0.10	12.92 ±0.05	12.65 ±0.05	-----
58.419	11.19 ±0.10	11.24 ±0.10	11.12 ±0.10	11.08 ±0.10
58.437	11.12 ±0.10	11.22 ±0.10	11.16 ±0.10	11.10 ±0.10
59.299	11.47 ±0.10	11.30 ±0.05	11.16 ±0.05	11.21 ±0.06
59.350	11.37 ±0.10	11.33 ±0.05	11.17 ±0.05	11.24 ±0.06
59.416	11.52 ±0.10	11.31 ±0.05	11.18 ±0.05	11.37 ±0.06
61.267	11.66 ±0.10	11.54 ±0.08	11.46 ±0.08	11.39 ±0.08
61.414	11.76 ±0.10	11.60 ±0.08	11.52 ±0.08	11.46 ±0.08
62.308	12.07 ±0.10	11.87 ±0.08	11.81 ±0.08	11.61 ±0.10
62.444	12.09 ±0.10	12.01 ±0.10	11.88 ±0.10	11.79 ±0.10
63.405	12.26 ±0.10	12.03 ±0.06	11.89 ±0.06	11.59 ±0.08
64.264	12.38 ±0.10	12.07 ±0.10	11.94 ±0.10	11.77 ±0.10
64.404	12.38 ±0.10	12.23 ±0.10	12.06 ±0.10	11.86 ±0.10
65.370	-----	12.27 ±0.10	12.17 ±0.10	11.91 ±0.10
66.324	12.60 ±0.10	12.52 ±0.10	12.35 ±0.10	12.15 ±0.10
69.391	13.59 ±0.10	13.06 ±0.10	12.83 ±0.10	12.46 ±0.10
69.410	-----	13.12 ±0.10	12.80 ±0.10	-----
75.326	13.45 ±0.10	13.03 ±0.10	12.70 ±0.10	12.40 ±0.10
77.340	-----	12.56 ±0.10	12.38 ±0.10	11.90 ±0.10

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