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NEW ECLIPSING BINARY STAR CoD –24°12698 IN THE DIRECTION OF THE STAR-FORMING REGION ρ Oph

The members of the Upper Scorpius region were observed by Eggen (1983) in an extensive intermediate band and H_β photometry. He detected the variability of CoD −24°12698 (SAO 184441). The star was changing its light from $10\overset{m}{.}1$ V (August 24, 1980) to $10\overset{m}{.}3$ V (September 23, 1981). In September 1980 the star had a brightness of $9\overset{m}{.}4$ R and $0\overset{m}{.}594$ R−I while the respective values were and $9\overset{m}{.}7$ and $0\overset{m}{.}607$ in July 1981. Herbig (see Struve and Straka, 1962) determined the spectral type to be A0 or A1, but found no emission in 1949. The star is situated in the direction of the star-forming region ρ Oph, near the weak-line T Tauri stars Rox 42 and Rox 43.

We present the results taken from a long-term photometric monitoring program for CoD −24°12698 made during three runs from August 5, 1993 to July 23, 1996. Our UBVR observations were obtained at the Mt. Maidanak Observatory, Uzbekistan, using 0.48m and 0.60m telescopes equipped with a pulse counting FEU-79 photomultiplier tubes. The mean error of a observation is typically $\pm\ 0\overset{m}{.}01$ in V. CoD−24°12690 was used as comparison star ($7\overset{m}{.}538$ V, $0\overset{m}{.}012$ U−B, $0\overset{m}{.}382$ B−V and $0\overset{m}{.}236$ V−R).

A periodogram analysis of observations proved that CoD −24°12698 is a short period eclipsing binary star likely of W UMa type. The ephemeris for the primary minimum is

$$\begin{array}{lcll} \text{Min.I} = \text{JDH } 2449204.349 & + & 0\overset{d}{.}589352 & \times\ E \\ \qquad\qquad \pm 1 & & \pm 1 & \end{array}$$

The total number of observations are 151 in U, 203 in B, 210 in V and 197 in R. We detected 11 moments of minima and they are listed in Table 1. The light curves of the binary are shown in Figure 1. The main photometric characteristics are given in Table 2.

Table 1

JDH2400000+	E	O−C	JDH2400000+	E	O−C
49213.1855	15	$-0\overset{d}{.}004$	50243.3686	1763	$-0\overset{d}{.}008$
49226.1520	37	−0.003	50243.3788	1763	+0.002
49520.2530	536	+0.011	50249.2761	1773	+0.006
49540.2772	570	−0.002	50275.1964	1817	−0.005
49540.2821	570	+0.002	50275.2101	1817	+0.008
49543.2351	575	+0.009			

Table 2

Phase	V	U−B	B−V	V−R
Max	10.01	0.40	0.95	1.03
MinI	10.38	0.49	1.00	0.96
MinII	10.11	0.40	0.95	1.03

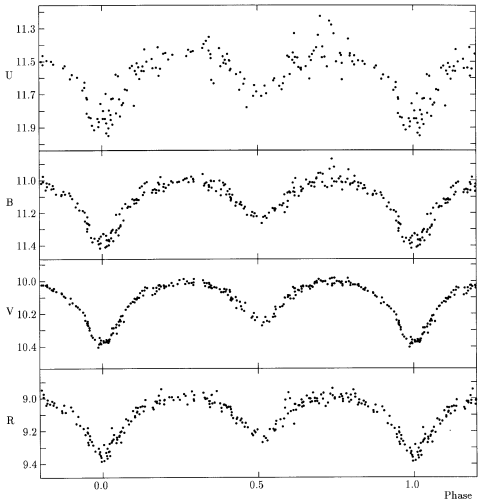

Figure 1. Light curves in the U,B,V and R bands for CoD −24°12698.

The change in the colors of the variable is slight. We note that the position of the binary in the color-color diagram does not correspond to a spectrum A0. The components of the binary may be F-G stars. Perhaps, the binary is a foreground object in the direction of the star-forming region ρ Oph.

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