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**PHOTOGRAPHIC PHOTOMETRY OF RT CEP**

RT Cep is a long period variable of the Mira Ceti type. Its period is 621.55 days and its brightness varies between  $11^m.7$  pg and  $\geq 14^m.7$  pg (Kholopov et al., 1985). RT Cep is located near the open cluster NGC 7142 and the emission nebula NGC 7129, but is probably not connected to them. On objective prism plates the star was recognized as a very strong H $\alpha$ -emission star (Semkov and Tsvetkov, 1986).

The photographic observations in the UBV system were made with the 50/70/172 cm Schmidt telescope of the National Astronomical Observatory of the Bulgarian Academy of Sciences (Tsvetkov et al., 1987). As photometric standards we used stars in the open cluster NGC 7142 (Hoag et al., 1961). During the period 1980-1990 two new epochs of maximum of brightness [J.D. 2447208 and J.D. 2447773 ] were observed (Tab. 1).

**Table 1.** Photometric behavior of RT Cep in the period 1980-1990

J.D. 244...	U mag	B mag	V mag	J.D. 244...	U mag	B mag	V mag
4492	-	>18.0	-	7387	-	16.0	-
4494	-	-	16.0	7442	>18.5	>18.0	-
4496	>18.5	-	-	7447	-	>17.5	-
5959	14.7	-	-	7473	-	>17.5	15.6
5960	-	13.8	-	7626	-	>17.5	-
6563	-	13.6	11.1	7643	-	>17.5	-
6711	-	-	13.3	7706	-	>17.5	-
6999	-	-	15.1	7732	-	>17.5	-
7000	-	>17.5	-	7773	15.0	13.8	11.4
7001	-	-	14.8	7776	-	14.2	-
7064	>18.0	17.1	14.3	7828	15.2	14.0	-
7122	-	15.1	-	7829	15.3	14.1	-
7207	-	12.5	-	7830	-	14.1	11.6
7208	-	12.3	-	7923	16.3	15.4	12.9
7304	-	15.0	-	7925	-	16.1	-
7333	-	15.4	-	7946	-	16.4	-
7361	-	15.7	-	7947	17.3	-	-
7383	>18.0	16.6	14.2	7955	-	16.6	-
7384	17.0	16.8	14.2	7978	-	16.8	-
7385	-	16.9	-				

The light curve of the star around the observed maxima is shown in Fig. 1. Because RT Cep is fainter than  $18^m$  in B-light in the minimum, it can be registered only in case of good atmospheric conditions.

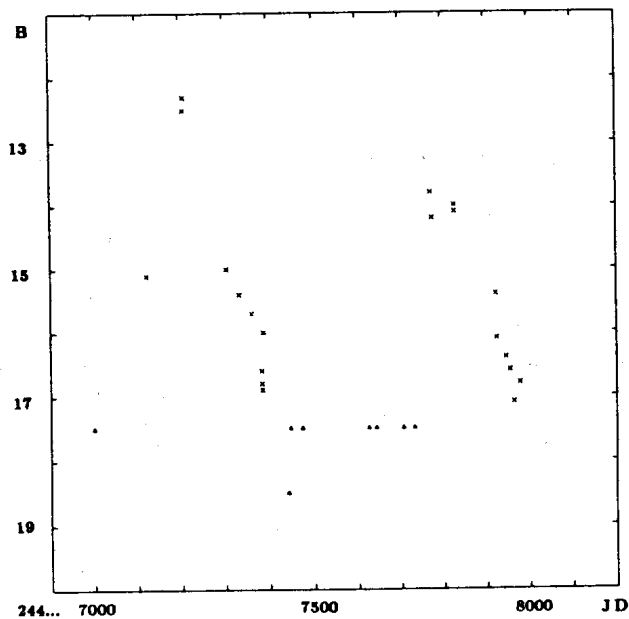


Figure 1. Light curve of RT Cep during observational period September 1987 - March 1990 in B-light. The values of brightness when the star is below the limit of our plates are marked with  $\Delta$ .

All known epochs of maximum (Schneider, 1959) and those observed during our campaign are given in Table 2.

Table 2. Observed epochs (J.D.) of corresponding maxima (E) of RT Cep and calculated differences with (O-C) with the GCVS's period  $\div$  Max = J.D. 2439724.0 + 621.55 E

Max. J.D. 24...	E No.	O-C days	Max. J.D. 24...	E No.	O-C days
16720	-37	-7	27300	-20	7
17920	-35	0	29170	-17	12
24800	-24	-7	34130	-9	0
25425	-23	-3	39724	0	0
26059	-22	9	47208	12	25
26675	-21	4	47773	13	-31

According to the variable star parameters from the GCVS the deviations between the observed and the calculated maxima are shown in Fig. 2. The shifts of the two new maxima are probably due to nonperiodic small changes.

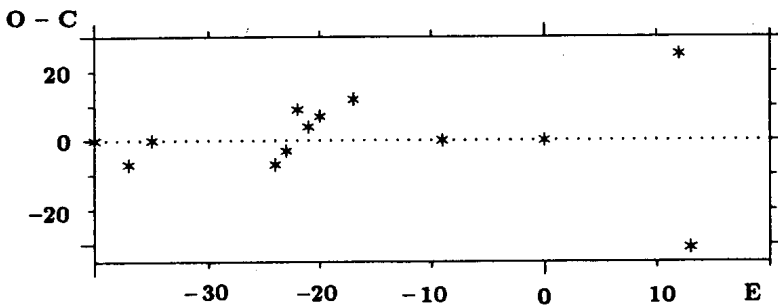


Figure 2. Relation between observed maxima (E) of RT Cep and calculated differences with (O-C) with the GCVS's period.

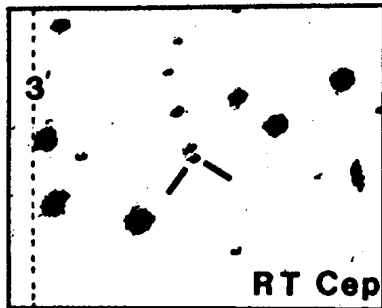


Figure 3. Identification chart of RT Cep as a reproduction from the 30 minute exposure photographic plate in B-light obtained with 50/70 cm Schmidt telescope of Rozhen observatory on September 26, 1987. North is on the top, East - on the left.

The observations on September 26, 1987 in the minimum showed that RT Cep is a double star. The distance between the two components is about 5 arcsec. On the blue reproduction (O-1165) of the Palomar Sky Survey Atlas the two components are also distinguishable, and RT Cep has been in minimum - the magnitude is  $B_{\text{poss}} = 19^m.5$ . The southern component of the pair, which is the redder one, is certainly RT Cep. In this case the observed amplitude of variability reaches about  $7^m.2$  (pg) which is consistent with the relationship between amplitudes and periods for long period variables (Duerbeck and Seitter, 1982).

E. H. SEMKOV

Department of Astronomy and  
National Astronomical Observatory,  
Bulgarian Academy of Sciences,  
BG-1784 Sofia, Bulgaria

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