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**V398 Cyg: period determination for an  
unusual EA system**

V398 Cyg is a so far quite ignored variable star. The GCVS lists it as an EA eclipsing system with a possible period of  $9^d.2122$  and a photographic magnitude range of 12.5 - >15.0.

V398 Cyg belongs to the field of Nova Cygni 1970, on which many plates have been exposed at Asiago Astrophysical Observatory with the two Schmidt telescopes. On all available, good quality B (103a-O + GG13) and V (103a-D + GG14) plates, we have estimated the magnitude of V398 Cyg with respect to the photometric sequence given by Kohoutek (1969) for the nearby slow nova V1329 Cyg. The results are given in Table I, where heliocentric Julian days are used.

We have examined the data in Table I with a Deeming code (Barbieri et al. 1977) to determine the eclipse period. The only admitted period is  $2^d.4481$ . The following ephemeris gives the instants of minima in our B light curve:

$$B_{\min} = 2445227.396 + 2^d.4481 * E \quad (1)$$

Linking our minimum to that listed in the GCVS should result in:

$$B_{\min} = 2425157.27 + 2^d.4481735 * E \quad (2)$$

A plot of the data in Tab.I with the period listed in the GCVS ( $9^d.2122$ ) shows the points defining the B minimum uniformly distributed in phases.

The B and V light curves, using Tab.I and ephemeris (2), are presented in Fig.1. The eclipse in the B band is well defined. Its amplitude could be as large as 5 magn. In fact, the  $B > 18.0$  point comes from a good plate with no emulsion defect on the V398 Cyg expected position. The eclipse in the V band is much less well defined. Anyway it appears to be of much lower amplitude than the B one. Out of eclipse the B-V index is about 0.0, in agreement with a B&C+CCD red spectrum taken for us by J.Hron of Astron. Inst. of Vienna, showing an early type star. In eclipse the B-V color index largely increases, but no spectra are available for this phase.

Table I. B, V photographic photometry of V 398 Cyg

H.J.D.	B	V	H.J.D.	B	V	H.J.D.	B	V
2440508.341	13.2	13.2	41657.256	13.2	13.2	43753.472	13.1	13.2
40508.351	13.0	13.1	41658.260	13.0	13.2	43789.387	13.1	13.2
40748.547	13.3	13.2	41619.479	13.1	13.2	43805.484	15.2	13.9
40749.553	13.2	13.2	41624.459	14.0	13.3	44019.532	13.2	13.2
40763.472	13.0	13.1	41624.474	13.2	13.2	44022.541	13.2	13.3
40773.470	13.2	13.2	41627.400	13.2	13.2	44032.566	13.2	13.2
40778.517	13.2	13.2	42190.463	13.2	13.2	44033.517	13.2	13.2
40778.532	13.2	13.2	42713.303	13.2	13.2	44033.539	13.2	13.2
40794.442	13.2	13.2	42713.315	13.2	13.2	44044.491	13.2	13.2
40804.442	13.1	13.2	42716.396	13.2	13.1	44044.508	13.2	13.1
40804.458	13.1	13.2	43127.267	13.3	13.2	44136.466	13.2	13.2
40824.406	13.0	13.2	43127.283	13.2	13.2	44166.366	13.2	13.2
40824.419	13.1	13.2	43259.569	13.2	13.2	44198.329	13.2	13.2
40836.507	13.1	13.2	43284.473	13.2	13.2	44221.316	13.2	13.2
40839.415	16.5	13.2	43287.522	13.2	13.2	44261.559	13.2	13.2
40839.427	13.2	13.2	43294.366	13.2	13.2	44261.572	13.2	13.2
40916.276	13.0	13.2	43398.378	13.2	13.2	44812.363	13.2	13.2
40918.270	13.2	13.2	43405.411	13.2	13.2	44928.278	13.2	13.2
40918.286	13.0	13.2	43420.379	13.2	13.2	44928.301	13.2	13.2
41099.559	13.0	13.2	43429.398	13.2	13.2	45118.541	13.2	13.2
41099.572	16.6	13.2	43433.490	13.2	13.2	45118.573	13.2	13.2
41135.519	13.1	13.2	43433.302	13.2	13.2	45148.536	13.2	13.2
41167.433	13.1	13.2	43457.295	13.2	13.2	45201.368	13.2	13.2
41177.389	13.8	13.2	43457.393	13.2	13.2	45220.375	13.2	13.2
41214.271	13.3	13.2	43459.303	13.2	13.2	45227.395	13.2	13.2
41242.218	13.3	13.2	43462.346	13.2	13.2	45236.375	13.2	13.2
41279.289	16.6	13.2	43464.401	13.2	13.2	45252.325	13.2	13.2
41486.550	13.2	13.2	43480.226	13.2	13.2	45383.399	13.2	13.2
41572.371	13.3	13.2	43480.301	13.2	13.2	45551.441	13.2	13.2
41595.367	13.3	13.2	43482.228	13.2	13.2	45561.359	13.2	13.2
41616.280	13.3	13.2	43483.270	13.2	13.2	45620.460	13.2	13.2
41624.281	13.3	13.2	43483.257	13.2	13.2	45640.411	13.2	13.2
41651.341	13.3	13.2						

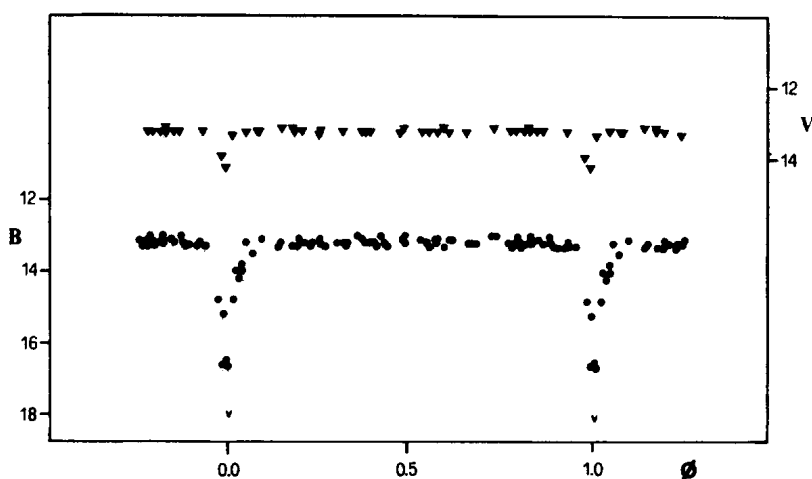


Figure 1. (top) Phase plot according to the ephemeris (2) of the V data in Table I. (bottom) Phase plot according to the ephemeris (2) of the B data in Table I. Note the "fainter than" mark on JD 2445227.396 near phase 0.0 .

A further puzzling feature comes from the analysis of 9 infrared plates (I-N + RG5). Only one of these plates has been exposed during a light minimum (HJD = 2444015.569, phase 0.008). On the V398 Cyg expected position on this plate no emulsion defect is visible and the star presents a deep minimum, while out of eclipse the star is bright and constant. A marked fall in the blue and in the infrared, while the visual is little affected, points towards a very strange eclipsing system.

Due to the very deep B minimum (5 magn. ?) this system should deserve further attention by the observers. Particularly useful should be an optical spectrum secured during a light minimum, to investigate the nature of the eclipsing star.

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#### References

- Barbieri, C., Romano, G., di Serego, A.S., Zambon, M.: 1977  
Astron. Astrophys. 59, 419  
Kohoutek, L.: 1969 IBVS 384.