

COMMISSIONS 27 AND 42 OF THE IAU
 INFORMATION BULLETIN ON VARIABLE STARS

Number 4567

Konkoly Observatory
 Budapest
 13 March 1998

HU ISSN 0374 – 0676

DZ CANIS MAJORIS, A NEW DOUBLE-MODE CEPHEID

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DZ CMa is listed in the GCVS-IV as a classical Cepheid with a period of 1.75434 days. It is of special interest owing to the fact that it is projected on the open cluster NGC 2360. Just a small subset of Cepheids are spatially coincident with open clusters. The only previous photoelectric observations for DZ CMa are 10 measurements by Diethelm (1986). Its light curve is therefore not well defined, which is why we included the star on our program of photoelectric observations for Cepheids.

New observations were made of DZ CMa using a one-channel photometer attached to the 0.5-m telescope of the South African Astronomical Observatory. A total of 28 measurements were obtained (Table 1), mainly in VI_c , from December 25, 1997, to January 3, 1998. The accuracy of the individual data is near $\pm 0^m01$ in all filters.

Table 1

JD_{hel} 2450800+	V	$B - V$	$(V - I)_c$	JD_{hel} 2450800+	V	$B - V$	$(V - I)_c$
08.4882	11.766	-	1.282	14.5085	12.350	-	1.467
09.3916	12.346	-	1.447	14.5534	12.367	-	1.476
09.4816	12.227	-	1.454	15.3437	11.889	-	1.319
10.3889	12.052	-	1.365	15.4396	11.956	-	1.348
10.5014	12.037	-	1.354	15.4804	11.940	-	1.328
11.4083	11.904	-	1.324	15.5103	11.955	-	1.349
11.5355	11.967	-	1.349	15.5641	11.968	-	1.351
12.3677	12.313	-	1.456	16.3042	12.060	-	1.381
12.4025	12.300	-	1.436	16.3986	12.076	-	1.406
12.4394	12.313	-	1.460	16.4773	12.102	-	1.404
12.4752	12.345	-	1.474	17.3058	12.206	1.193	1.420
12.5077	12.342	-	1.461	17.3518	12.206	1.238	1.412
12.5401	12.350	-	1.459	17.3930	12.193	-	1.418
14.4925	12.371	-	1.460	17.4335	12.158	-	1.407

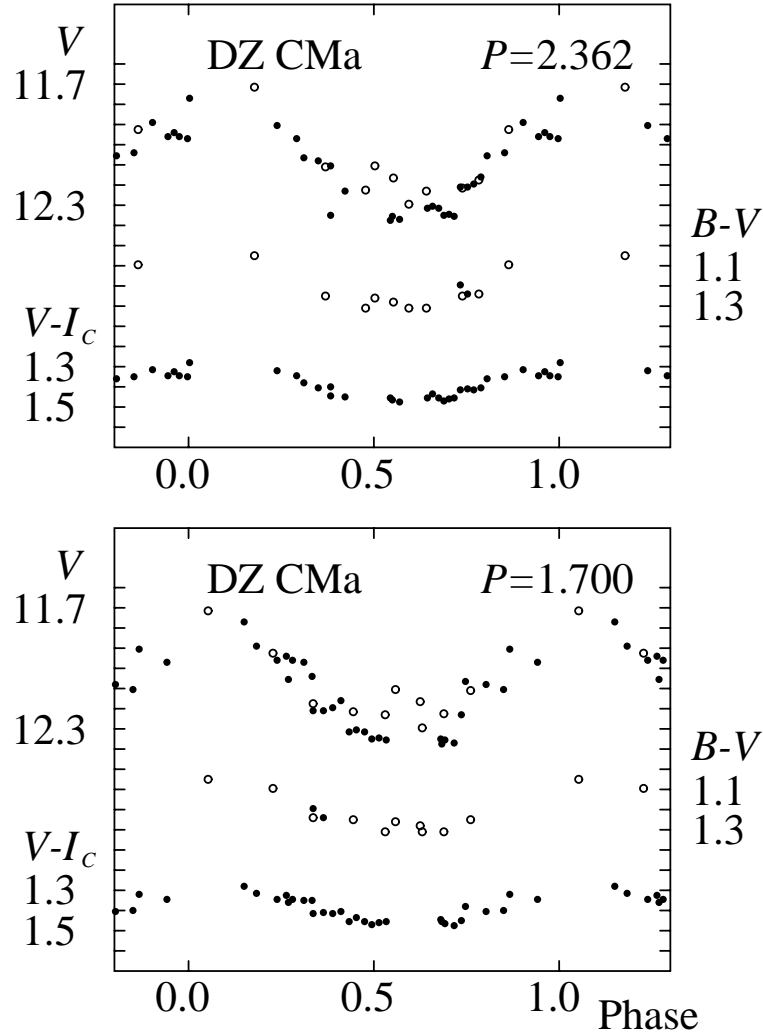


Figure 1.

A frequency analysis of our data in combination with Diethelm's (1986) observations shows that DZ CMa is most likely a double-mode Cepheid with the elements:

$$\text{fundamental: Max JD}_{hel} = 2450808.48 + 2^d 362896 \times E,$$

$$\text{first overtone: Max JD}_{hel} = 2450808.23 + 1^d 700131 \times E.$$

The elements are used in Figure 1 for plotting our observations (dots) with those of Diethelm (circles). The observed period ratio for the two pulsation modes is $f_1/f_0 = 0.7195$, which agrees closely with the results for other double-mode pulsators and is further confirmation that DZ CMa is a beat Cepheid.

The research described here was supported in part by the Russian Foundation of Basic Research and the State Science and Technology Program "Astronomy" to LNB and through NSERC Canada to DGT. We are grateful to the administration of SAAO for the allocation of observing time which made possible the observations presented here.

Reference:

Diethelm, R., 1986, *Astron. Astrophys. Suppl. Ser.*, **64**, 261