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Period change in AD CMi

A period change of AD CMi was first reported by Jiang (1987) and, in an independent way by Rodríguez et al. (1988). Although the two calculated values $\dot{P} = 1.9(\pm 0.1) \star 10^{-8}(d/yr)$ and $\dot{P} = 1.1(\pm 0.2) \star 10^{-8}(d/yr)$ respectively, are slightly different, it is clear that the period is now increasing.

In order to establish the ephemeris for AD CMi we have put together all the times of maxima reported by the above mentioned authors. Furthermore, we have also considered one new light maximum from Langford (1976). Furthermore, a new set of observations was collected on February 1988, at the Sierra Nevada Observatory, in Spain, and two new times of light maximum have been obtained by using the method described in Rodríguez et al. (1989).

In column 2 of Table 1 are listed all the times of maxima available up to date. In the last column, the references are: 1) Abhyankar (1959), 2) Anderson et al. (1961), 3) Langford (1976), 4) Epstein et al. (1973), 5) Balona et al. (1983), 6) Jiang (1987), 7) Rodríguez et al. (1988) and 8) our new maxima (1988). In total, times of 37 maxima (from 1959 to 1988) were used for the determination of the ephemeris of the light curve of AD CMi using the classical O-C method. We adopted an initial epoch of T=2436601^d.8226 and an initial period of P=0^d.12297431 (from Rodríguez et al., 1988). Resulting cycles E_i are listed in the third column of the Table. A least square fit of a linear ephemeris leads to the following elements:

$$T_0 = 2436601^d.8217$$

$$P_0 = 0^d.12297447$$

Residuals $(O\text{-}C)_I$ with respect to this linear ephemeris are shown

TABLE 1. Times of maxima of AD CMi

i	T_i (HJD) 2400000. +	E_i (cycle)	$(O-C)_I$ (day)	$(O-C)_g$ (day)	Ref
1	36601.8227	0	0.0010	0.0002	1
2	36602.8066	8	0.0011	0.0003	1
3	36602.9296	9	0.0011	0.0003	1
4	36604.8971	25	0.0011	0.0002	1
5	36627.7700	211	0.0007	-0.0001	1
6	36628.7538	219	0.0007	-0.0001	1
7	36629.7373	227	0.0004	-0.0004	1
8	36629.8602	228	0.0003	-0.0004	1
9	36931.762	2683	-0.0002	-0.0004	2
10	36932.747	2691	0.0010	0.0008	2
11	36934.836	2708	-0.0005	-0.0008	2
12	36969.762	2992	0.0007	0.0005	2
13	39202.729	21150	-0.0028	-0.0002	3
14	41010.6985	35852	-0.0040	-0.0005	4
15	43182.4297	53512	-0.0020	0.0011	5
16	43536.3494	56390	-0.0029	0.0000	5
17	43536.4727	56391	-0.0025	0.0003	5
18	44645.0877	65406	-0.0024	-0.0006	6
19	45766.3713	74524	-0.0001	0.0003	7
20	45768.3377	74540	-0.0013	-0.0009	7
21	45768.4606	74541	-0.0013	-0.0009	7
22	45771.4134	74565	0.0001	0.0005	7
23	45772.3961	74573	-0.0010	-0.0006	7
24	45772.5187	74574	-0.0014	-0.0010	7
25	46417.3991	79818	0.0009	0.0002	6
26	46418.2596	79825	0.0005	-0.0001	6
27	46418.3825	79826	0.0005	-0.0002	6
28	46419.2434	79833	0.0006	-0.0001	6
29	46419.3663	79834	0.0005	-0.0002	6
30	46443.1010	80027	0.0011	0.0004	6
31	46443.2243	80028	0.0014	0.0007	6
32	46443.3470	80029	0.0012	0.0005	6
33	46444.0850	80035	0.0013	0.0006	6
34	46444.2082	80036	0.0015	0.0008	6
35	46444.3312	80037	0.0016	0.0009	6
36	47219.4395	86340	0.0018	-0.0004	8
37	47220.4228	86348	0.0013	-0.0009	8

in the fourth column of the Table, and plotted in Figure 1. From this figure it appears that a quadratic fit as

$$T_{max} = T_0 + P_0.E + A.E^2$$

and the following coefficients

$$T_0 = 2436601^d.8225(\pm 0.0002)$$

$$P_0 = 0^d.12297426(\pm 0.00000002)$$

$$A = 2^d.7 * 10^{-12}(\pm 0.2)$$

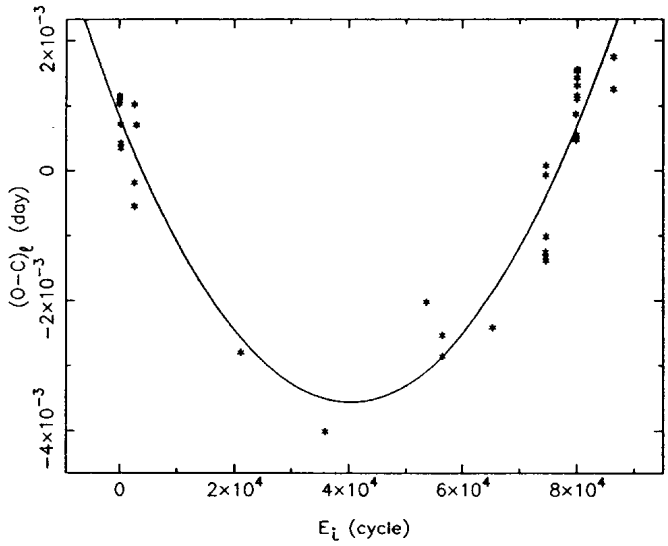

Figure 1. O-C versus epoch diagram using the linear ephemeris

fit the data much better than the linear ephemeris in according with earlier results obtained by Jiang (1987) and Rodríguez et al. (1988). Second residuals $(O\text{-}C)_q$ listed in the fifth column in the Table appear to be randomly distributed around zero showing that the residuals $(O\text{-}C)_l$ can be well fitted by a parabola, indicating that the pulsation period of this star is increasing at a rate of $\dot{P} = 1.6(\pm 0.1) \star 10^{-8}(d/yr)$.

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