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THE BEAT PERIOD OF CY AQUARII

In order to clear up the puzzling problem of the beat phenomenon of the RRs variable CY Aqr (cf. papers of Elst (1972), Fitch (1973), Geyer and Hoffmann (1975), Percy (1975)) we organized a campaign of observation from 17 to 27 August 1976.

More than 4000 visual estimates were performed by a team of seven observers using 8 inch-reflectors (A.Figer, J.F.Le Borgne, A.Marot, Ph.Ralincourt, C.Romoli, A.Royer, G.Troispoux).

Table 1 lists the 40 means of the times of the maxima observed by several observers. The number n of observers is given in column 2. The O-C values in the third column refer to the G.C.V.S. (1976) ephemeris, i.e.:

$$\text{Max} = \text{J.D.hel. } 24\ 41\ 959.4018 + 0^{\text{d}}061\ 038\ 354\ \text{E}$$

We find a standard deviation of the 191 individual determinations between 0.0012 and 0.0026 day, varying with the concerned observer. Thus a weighting by  $1/\sigma^2$  has been applied in the calculation of the mean times. The final standard deviation of each mean time of maximum is given in the last column. Using a least squares procedure we find a solution explaining the observations, the beat period being:  $(3.575 \pm 0.025)P_0$  ( $P_0$ : fundamental period of light variations of CY Aqr). The resulting ratio  $P_1/P_0$  of the first overtone to the fundamental would be 0.720 or 0.781.

An ephemeris for the beat phenomenon is derived:

$$\text{Max (O-C)} = \text{J.D.hel. } 24\ 43\ 013.298 + 0^{\text{d}}2182\ \text{E} \\ \pm .025 \pm .0015$$

The mean curve of Figure 1 shows the variation of the O-C with phase of the beat period. Each dot represents a mean of several values taken from Table 1.

A close inspection of the photoelectric series by Zissell (1968) or Geyer and Hoffmann (1975) does not allow the rejection

Table 1

Maxima of CY Aquarii

J.D. hel. 24 00 000 +	n	O - C	$\sigma$	J.D. hel. 24 00 000 +	n	O - C	$\sigma$
43008 . 4110	5	+ .0041	.0007	43012 . 4971	6	+ .0006	.0007
. 4742	6	+ .0062	.0007	. 5573	5	- .0003	.0007
. 5308	6	+ .0018	.0007	. 6185	3	- .0001	.0008
. 5915	6	+ .0014	.0006	43014 . 5121	7	+ .0013	.0006
43009 . 3870	4	+ .0034	.0008	. 5732	7	+ .0014	.0006
. 4461	4	+ .0015	.0008	. 6326	6	- .0003	.0006
. 5065	3	+ .0009	.0011	43015 . 4880	5	+ .0006	.0006
. 5679	4	+ .0012	.0008	43016 . 4644	3	+ .0004	.0009
. 6309	4	+ .0032	.0008	. 5256	4	+ .0006	.0007
43010 . 3616	5	+ .0014	.0007	. 5906	2	+ .0045	.0011
. 4233	5	+ .0021	.0007	43017 . 3802	5	+ .0006	.0007
. 4838	4	+ .0015	.0008	. 4416	7	+ .0010	.0006
. 5440	4	+ .0007	.0007	. 5012	6	- .0005	.0006
. 6047	4	+ .0004	.0007	. 5618	6	- .0009	.0007
43011 . 3971	5	- .0007	.0007	. 6243	4	+ .0006	.0007
. 4578	5	- .0011	.0007	43018 . 3583	4	+ .0021	.0007
. 5208	5	+ .0009	.0007	. 4184	2	+ .0012	.0009
. 5832	5	+ .0023	.0007	. 4788	4	+ .0005	.0007
. 6412	7	- .0008	.0006	. 5420	4	+ .0027	.0007
43012 . 4361	6	+ .0006	.0006	. 6004	4	+ .0000	.0007

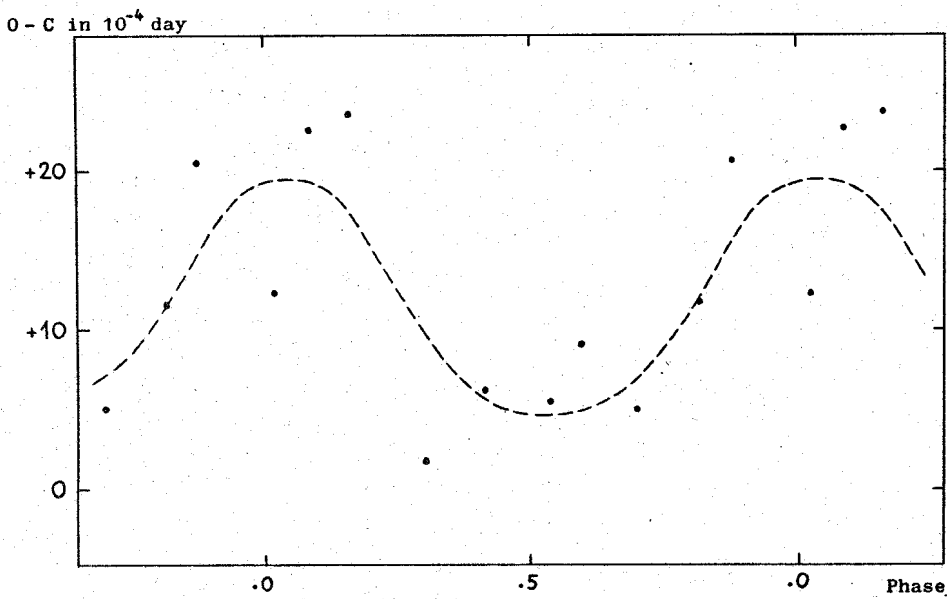


Fig. 1 - Variation of the O - C with phase of the beat period.

of the proposed 0.218 day beat period.

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