COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

Number 2030

Konkoly Observatory
Budapest
1981 October 22

HU ISSN 0374-0676

STANDSTILL OF γ CrB

In the course of the photoelectric monitoring of low-amplitude δ Scuti stars we observed γ CrB on four nights at Konkoly Observatory. Throughout the observations the equipment was the same as described by Kovács (1981) for the 100cm telescope and by Szabados (1977) for the 50cm telescope. Measurements were taken only in V, using δ CrB as a comparison star in the cycle δ CrB, γ CrB, sky with each observation consisting of three (for the sky only one) consecutive 20s (at the 50cm telescope 10s) integrations.

Differential magnitudes (in the instrumental system and not corrected for differential extinction) are shown in Fig. 1.

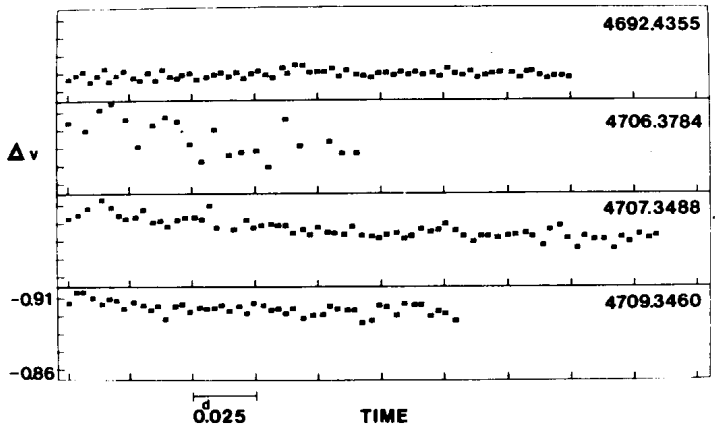

Fig. 1. Light curves of γ CrB. The numbers on the right of each graph are the heliocentric Julian Dates of the first observation of each night minus 2440000. The instrumental differential v magnitude scale is the same for each graph as indicated and refer to the comparison star δ CrB in the sense m(var)-m(comp). The data on JD. 2444692 were obtained by the 100cm telescope, the others by the 50cm telescope.

Except for the linear trends and some suspected variations at JD. 2444706, the light curves are constants within the error of the measurements (i.e. 0.005-0.002 mag). The reason for the appearance of the linear trends in the data obtained by the 50cm telescope is not known, but it may partly be accounted for the colour dependent extinction not having been taken into consideration. The systematic difference between the average light level of the data of the two telescopes may be due to the slight difference between the two optical systems. This argument is supported by the observations made simultaneously by the two telescopes on 6/7th May, 1981 (UT), showing an average difference of ≃0.04 mag between the two light curves (because of the very poor photoelectric quality of this night we have not published these data).

Our data seem to support the results of Tippets and Wilcken (1970) who found no observable variation of this star in contradiction to the observations of Percy (1970), showing light variation of 0.02-0.05 mag on a time scale of ≃0.03 days. Probably this contradiction and the very early spectral type of this star (A0 IV, according to the Catalogue of Bright Stars (Hoffleit, 1964)) led Breger not to include γ CrB in the latest list of δ Scuti stars (Breger, 1979).

Though the light curves do not indicate any permanent variation, it is still useful to calculate the frequency spectrum of the data. By use of the technique of Fourier analysis of unequally spaced data (Deeming, 1975), the power spectrum for all our data was calculated and plotted (Fig. 2). Before calculating the frequency spectrum, low frequency filtering (i.e. straight line fitting) was applied for each night of observation. Though close to the noise level, there are three well separated peaks in the spectrum. Their frequencies and amplitudes (i.e. half of their total variations) are: 5.06 c/d (0.0017 mag), 14.62 c/d (0.0018 mag), 23.59 c/d (0.0014 mag). Leaving out the data obtained on JD. 2444706, the spectrum changed somewhat but not radically (i.e. the features mentioned above were still observable within ≃1 c/d of the frequencies determined previously).

For comparison, two of the light curves (labelled "B Filter E.S.T. 1-7-69" and "B Filter 22-7-69" respectively) of Percy

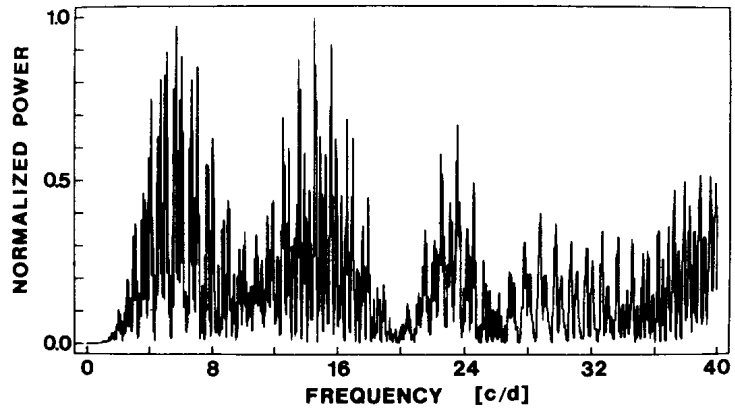

Fig. 2. Power spectrum of γ CrB calculated by all the light curves plotted in Fig. 1.

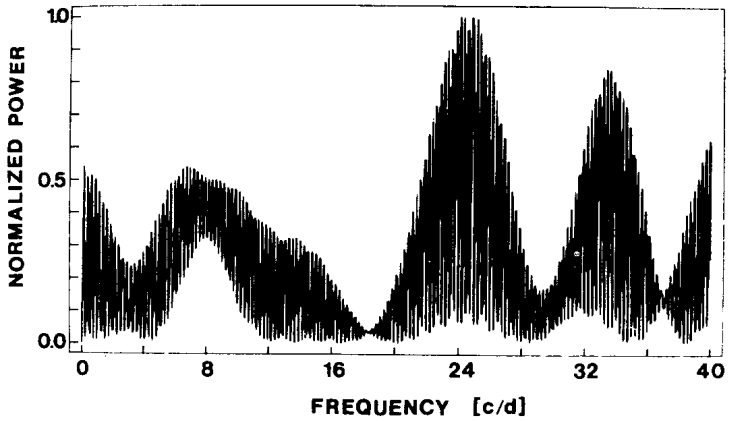

Fig. 3. Power spectrum of γ CrB calculated by using the data of Percy (1970) (for details, see text).

(1970) were sampled at their observed points and analysed. The power spectrum of these data is shown in Fig. 3. Because low frequency filtering was not applied to these data, a considerable amount of power can be observed at the low frequency region. In spite of the complexity and unresolved nature of the

spectrum in Fig. 3, some similar features between the two power spectra are suspected.

At present we know nothing about the nature of γ CrB. The results of frequency analysis may indicate some sign of regularity. Nevertheless, the very small amplitudes of the light variation in our observations can hardly be explained by a very strong beat phenomenon. Whatever the reason for the light variation of γ CrB, its nature seems to be quite different from that of the normal δ Scuti stars.

We are grateful to Dr. B. Szeidl for his valuable remarks relating to the frequency analysis.

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