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PHOTOMETRIC OBSERVATIONS OF THE ECLIPSING VARIABLE ZZ Cyg

ZZ Cyg is an eclipsing binary of EA type (F7:V + K5 IV:, 10.61 - 11.69 V, $P = 0.6286148^d$), well enough investigated as an Algol star. This system is of special interest nevertheless because there is information on possible Delta Scuti type physical variability of the hotter component: light amplitude is about 0.05^m with a period about 0.1 day (Hall, Cannon, 1974). If so, then the hotter component of the ZZ Cyg system is the first known pulsating Delta Scuti star which lies well outside the instability strip adopted now: $M_V = + 4.16$, $T_e = 5920^{\circ}$ K, these parameters are from the paper of Brancewicz and Dworak (1980). The place of the hotter component of ZZ Cyg on the HR diagram is shown in Figure 1: the star is situated to the right from the Delta Scuti instability strip.

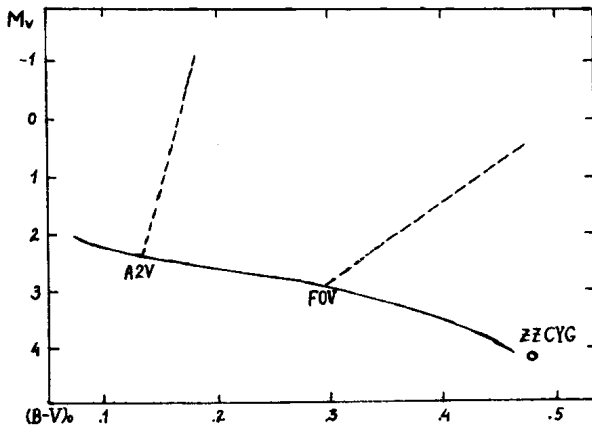


Figure 1

Mass and radius values from the same paper allow us to calculate the pulsation constant Q equal to about 0.08 and the rotation velocity $V_{\text{rot}} = 97$ km/sec (assuming the synchronism between rotation and revolution in this system) for the hotter component of ZZ Cyg. The large rotation velocity is not surprising for Delta Scuti stars, but $Q = 0.08$ is too large and this is the reason for doubts at least in the correctness of the period value.

For the direct examination of the hypothesis of the hotter component being a pulsating star we observed ZZ Cyg photoelectrically. Naturally, we are interested in the behaviour of ZZ Cyg outside the principal minimum. This star was observed at the High Altitude Station of Sternberg Astronomical Institute, near Alma-Ata. The 48-cm reflector with one-channel pulse counting photometer was used for seven nights during July-September, 1981. A diaphragm of 29" was used and consequently ZZ Cyg was observed together with the visual component ($\rho = 8.5$). Mean accuracy of our photometry was 0.01 magnitude. During the whole observing season 450 light measurements were obtained in the BV system. BD + 46^o2930 was used as a comparison star.

All light measurements made during different nights were in good accordance. This indicates the absence of any pulsational light variability of the F7-component of ZZ Cyg; at least, this concerns to short periodic light variability of Delta Scuti type.

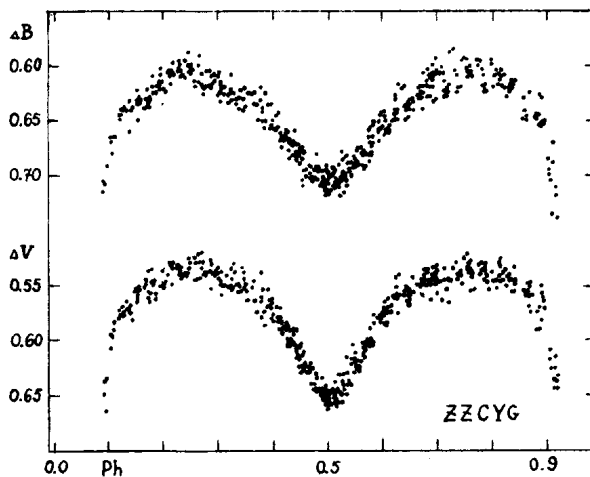


Figure 2

The mean light curve of ZZ Cyg based on our observations is shown in Figure 2, light elements are from the Third Supplement to GCVS. This light curve shows rather strong effect of ellipticity of the components.

We observed min I during the night 4/5 July, 1981:
JD Hel = 2444790.3971, O-C = +0.0120 days, the depth of min I is 1.13 in B and 1.02 in V.

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