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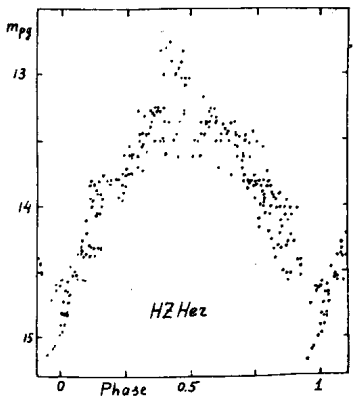
ON THE NATURE OF THE OPTICAL VARIATIONS OF HZ Her=Her X1

The variable star HZ Her was recently identified with a close binary system, containing the X-ray pulsar Her X1 (1-3). Using 249 old plates (1907-1972) we investigated the optical periodical variability (4) (see Fig.1). The moments of optical minima coincide with the epochs of X-ray eclipses derived in (5). The period $p=1^d.70017$ is stable during 65 years. The light variations are symmetrical to phase 180°; the light intensity monotonically increases from 0° to 180° and decreases from 180° to 360°. The hemisphere of the optical component turned to the X-ray source is three times brighter than the opposite one. Therefore we suggest that the reflection effect is the main cause of the light variations. The X-ray radiation, falling on the surface of the visible component is absorbed in the photosphere and reradiated in the optical and ultraviolet spectral bands. The importance of X-ray heating of the normal component in X-binary system was pointed out in (6, 7). The spectral class lies in the range B2-A7 V (8-10), the earlier spectrum is at the brightness maximum. In this picture the latest observed spectrum reflects the properties of the visual star. Its mass must be of the order of $2M_\odot$, its distance is about 1.5 kpc and its z -coordinate is about 750 pc. At this distance the X-ray luminosity of the system will be about 3.10^{35}-10^{36} erg/sec and exceeds the optical luminosity of the A7V star ($\sim 10^{34}$ erg/sec). This is in rather good accordance with the estimation of X-ray energy needed for increasing the brightness of the optical component due to reflection effect. The dispersion



of points near the maximum of the light curve is real and probably correlates with the cycle of the X-ray radiation, which is observed only 9 days during every 36 day cycle (5). If there is a real correlation, the maximal optical luminosity corresponds to the phase 0.5 of the 36 day cycle, when the X-ray flux in the direction to the Earth is absent.

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