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SPECTROSCOPIC INVESTIGATION OF VZ Cnc

VZ Cnc is an RR_s star according to the GCVS (Kukarkin et al. 1969). One of its main features is the clearly marked Blazhko effect. Fitch (1955) obtained the period of the Blazhko effect ($P_B = 0^d.716$, $P_o = 0^d.178$). The light variation period P_o has remained constant for 70000 epochs (Firmanyuk, 1980). Photoelectric observations of VZ Cnc were carried out for two nights in March 1980 with the aid of the Crimean Astrophysical Observatory's 64 cm reflector. Comparison of the author's observations with those of Todoran (1976) and Mochan (1980) shows that P_o continues to be constant and the observations satisfy the linear elements:

Max hel JD = 2433631.8655 + $0^d.17836367$.E (Todoran, 1976)

The Ψ phases of the Blazhko effect are also calculated in accordance with linear elements:

Max hel JD = 2433631.8605 + $0^d.716292$.E' (Todoran, 1976).

The spectroscopic material was obtained in February and March 1980 with the aid of a diffraction-grating spectrograph in Nasmith focus of the 122 cm reflector of the Crimean Astrophysical Observatory. 39 spectrograms with linear dispersion of 37 Å/mm were obtained. These spectrograms were processed by the generally accepted methods and divided into two groups in accordance with the ψ phases of the Blazhko effect (maximum and minimum).

The estimates of T_{eff} and $\log g_{eff}$ for various phases of light variation and Blazhko effect were made as a result of the comparison of observational $H\gamma$ profiles, and theoretically calculated by the Kurucz method (1979). The observed profiles are in better agreement with Kurucz's (1979) ones than the calculations of Searle and Oke (1962). To eliminate the effects of the splitting of the lines we gave more weight to the longer wavelength wing, although the profile of the line was always symmetrical within

the errors of measurements.

The results are presented in Figure 1. The changes of effective

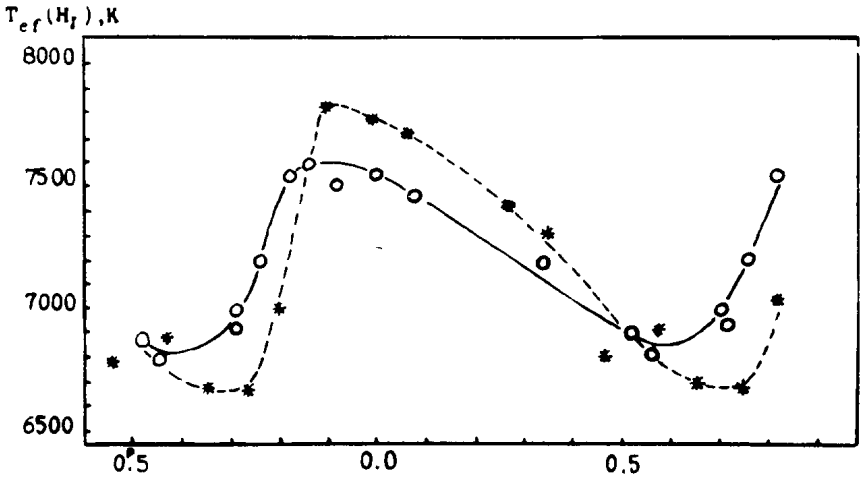

Figure 1

temperature with the light variation phase differ for the different Blazhko effect phases studied. The amplitude of T_{eff} variation for Ψ = 0.453 - 0.730 is greater than for Ψ = 0.730 - 0.920. Also the moments of maxima for these curves are displaced. The T_{eff} variation curve for the maximum of the Blazhko effect (Ψ = 0.453 - 0.730) is more asymmetric and in the phases φ = 0.750 - 0.920 we observe a sharp increase in T_{eff}, whereas the curve for Ψ = 0.730 - 0.920 shows smooth variation with light variation phase.

The accuracy of the determination of log g_{eff} does not permit us to discover the differences connected with the Blazhko effect, nor to trace the g_{eff} variation with phase with any degree of confidence. Our average value of $< \log g_{eff} > = 2.7$ is greater than that obtained by Danziger and Oke (1967), but it does not fall into the region of g_{eff}, accepted for the RR_s and δ Sct stars (Jones, 1973).

We defined the electron concentration in the atmosphere of VZ Cnc by the methods of Inglis-Teller and Unsöld. The calculations were made utilizing the methods and corrections expounded

by Kopylov (1961, 1966). The average electron concentrations are log $n_e(n_m)$ = 13.22 and log n_e (Hγ, Hδ) = 15.17. These quantities correspond to the electron concentrations in the atmospheres of the normal stars A8 III - F2 III. The electron concentrations $n_e(n_m)$ calculated for each phase showed no clear dependence on period. Consequently, it would seem that the conditions in the atmospheric layers, responsible for the formation of n_m are relatively stable. According to log $n_e(n_m)$ - Sp plots (Kopylov, 1961) VZ Cnc is a star of luminosity class III.

The variation in the strength of hydrogen lines with phase of light variation is common for stars of this type. The amplitude of variation is 25 - 40% and decreases with increase in line number.

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