THE LIGHT AND SPECTRUM VARIABLE CP2 STAR HR 6127

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ABSTRACT. Photometric and spectroscopic variability of HR 6127 was found. The value of the magnetic axis inclination was derived from the radial velocity variations of metallic lines. The star was classified as cool CP2 star.

1. INTRODUCTION

The studied star was alternatively classified as A2p Si, Sr (Cowley et al., 1969), normal A1 V (Bonsack, 1974), A2 Si 3955 (Floquet, 1975), early Am (Cowley, 1976), normal with strong V II lines (Cowley et al., 1978) and as cool Ap star (Žižňovský, 1980b). Pirronello and Strazzula found its Sr, Y and Zr abundances to be typical for Am stars. Adelman and Pyper (1983) admit a mild Ap star classification. Possible light and spectral variability was reported by Žižňovský (1980a). Magnetic field of the value of 0.1 tesla can be expected from the Geneva photometry by Hauck and North (1982). Variable magnetic field of (-0.03 to -0.1) tesla was found by Glagolevskij et al. (1984).

2. OBSERVATIONS

Photometric observations of HR 6127 were performed with the 0.6 m telescope of the Skalnaté Pleso Observatory in the years 1981 - 1982. An intermediate-band filter centered to 526 nm was used, in order to detect possible 530 nm continuum depression variability. Variability of the star in the mentioned spectral region was expected, as observations made by Gettys and Schild (1977) indicated variable values of the A(53) peculiarity index for HR 6127.

The star was observed in 19 nights, BD + 54 1809 served as the comparison star. The amplitude of the light variations is 0.017 mag. The interval of (0.5 - 1.75) days

C. R. Cowley et al (eds.), Upper Main Sequence Stars with Anomalous Abundances, 429–432.

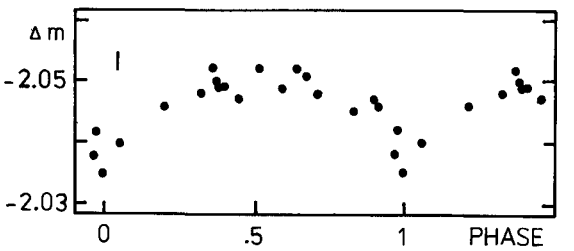

Figure 1. Light curve of HR 6127. The 3 value is marked in the upper left corner.

was searched for periodic variability, using a program written according to Morbey (1978). The best fitting yields to the following ephemeris:

$$JD\ min = 2\ 444\ 985.6031 + 2.144202 \times E.$$

The light curve is represented in Figure 1. Dots are nightly means, each dot represents 10 to 140 individual measurements.

The spectroscopic material consists of 30 spectrograms obtained in Coudé spectrographs of 2m telescopes of Ondřejov and Rozhen observatories in the years 1975 - 1981. The dispersion of the spectra is 0.85 and 0.42 nm/mm for Ondřejov and Rozhen spectra respectively. Some of the spectra were underexposed, these were excluded from further interpretation.

Equivalent widths of spectral lines were measured on intensity tracings, using the intensitometer described by Minarovjech et al. (1983). Radial velocities of the metallic lines were measured at the Ondřejov Observatory's comparator, excluding the Ca II K line, which was measured

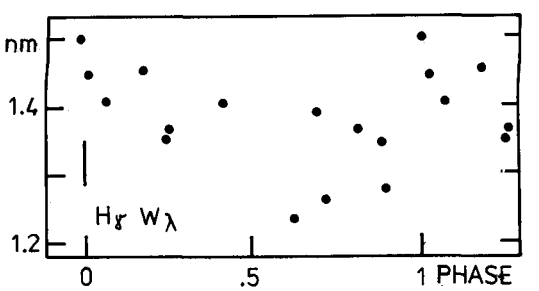

Figure 2. Variability of the hydrogen Hγ line equivalent width in the photometric period. The mean value of standard errors is marked at the left size of the figure.

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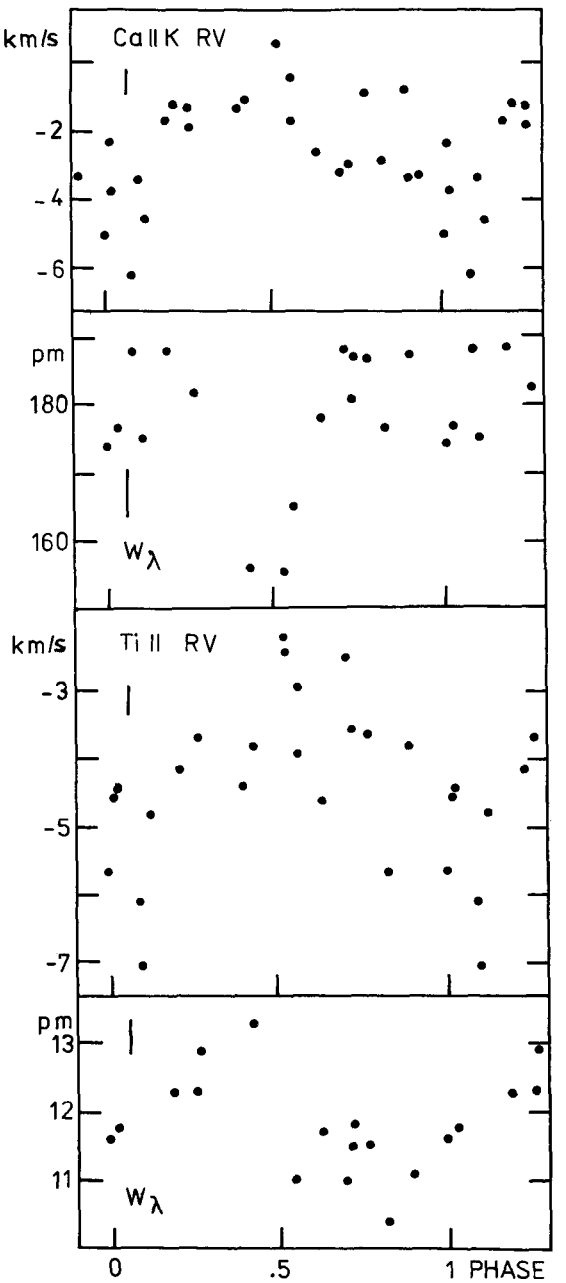

Figure 3. Radial velocity and equivalent width curves for Ca II and Ti II lines. Mean values of standard errors are marked at the left side for each data set.

at the TV-equipped comparator of the Skalnaté Pleso Observatory. Radial velocities and equivalent widths of spectral lines of Ca II K, Ti II, Sr II, Si II and Sc II and equivalent widths of Fe I and the Hγ line show periodic variability in the photometric period. The resulting curves for the Hγ, Ca II K and Ti II lines are represented in Figures 2 and 3. Radial velocities are mean values of 16 Ti II lines, equivalent widths are means of 5 Ti II lines measured on each plate.

3. DISCUSSION

The observed light and spectral variability of HR 6127 can be explained by the oblique rotator model. From the Mg II 448.1 nm line halfwidth we derived following value of the projected rotational velocity: $V \sin i = 11.6$ km/s. Adopting the value of $R = 2.5\ R_\odot$ for the radius of the star, $i = 11^\circ$ for the angle of inclination can accepted. The positions of Ca II K, Ti II and Sr II spectroscopic spots are probably closely correlated with the visible magnetic pole of the star. The amplitudes of the radial velocity variations then lead to an unusual value of β, the angle of the magnetic axis inclination, $\beta \sim 13^\circ$. The problem of the magnetic field configuration is to be

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solved when magnetic field observations and their interpretation will be finished.

On the basis of presented light and spectral variability and the presence of magnetic field, HR 6127 is classified as cool CP2 star.

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