

SPECTRUM VARIATIONS OF THE CP2 STAR HD5797 = V 551 CAS

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ABSTRACT. Line spectrum variations of the CP2 star HD 5797 are studied. The obtained preliminary results show that intensities of the Fe, Cr, Ti and Sr lines vary in phase with an amplitude of about 1.5 - 2.0 times. The derived radial velocity of the star is -6.211.3 km/s.

The star HD 5797=V551 Cas is a less known CP2 star. Its belonging to the SrCr subgroup was established firstly by Walther (1949). Two spectrograms with a dispersion of 95 Å/mm at $H\gamma$ were obtained and on the first plate very strong SrII lines λ 4077Å and λ 4215Å were observed. On the second plate these lines were not so strong. Preston (1971) included HD 5797 in the list of Ap stars with small $v \sin i$. Especially for HD 5797 this value is less than 6 km/s. Using the width of spectral lines with different Lande factors, Preston estimated the mean surface magnetic field of HD 5797 - 1.8 kGs. Adelman (1973) included this star in the well-known list of 21 cool sharp-lined Ap stars. By the chemical composition HD 5797 differs from the other investigated stars by large excess of Fe, Cr, Ti, Mn, Nd, Gd and Si. The abundances of Sr, Y, Ca and V are solar. According to Wolff (1975) the photometric period is between 40 and 70 days. The period of 69.0 days is better than the other three - 45.5, 57.0, and 67.5 days but none of them can be eliminated.

The star HD 5797 is faint (V=8.5) and there are neither magnetic field measurements nor line spectrum variation studyings.

During 1984-1986 spectroscopic observations were carried out at the 2-m RCC telescope of BNAO. Nine spectrograms on IIAO emulsion were obtained with a dispersion of 18 Å/mm. The spectral resolution is 0.35 Å and the available wavelength region is λ 3700 - 4700 Å.

The main sources of line identifications were RMT (Moore, 1945), the book of Reader et al. (1980) and the unpublished Bidelman's list for HD 9996. The observed by us spectrum is very typical for SrCr star. It can be pointed out that on the obtained spectrograms the lines of EuII, especially λ 4205 Å, are not so remarkable as Preston and Adelman asserted.

Thirty spectral lines of FeI, FeII, CrI, CrII, TiI and SrII were selected for the equivalent width measurements. For the same lines radial velocities were derived. An oscilloscopic comparator of Barwik's type was used. The results obtained for the different elements were averaged and normalized by the Banner described in our paper (Iliev and Barzova, 1986). The variations of the equivalent widths were plotted versus phase using all four periods, proposed by Wolff (1975). If the phases are computed with periods of 69.0 or 45.5 days the scattering of the data points is smaller. Only with these periods the phase of maximum intensities of the spectral lines coincides with phase of the maximum light. Thus, the other two periods - 57.0 and 67.5 days can be rejected. It should be mentioned that the ratio between 69 and 45.5 days periods is practically 3:2. The ephemeris, given by Wolff (1975) has been adopted:

$$HJB(u \text{ max}) = 2\ 441\ 206 + 69.0E$$

The accuracy of the normalized equivalent widths is about 10%. The variations of the line intensities of the Fe, Cr, Ti, Sr are shown in the Figures 1a and 2a.

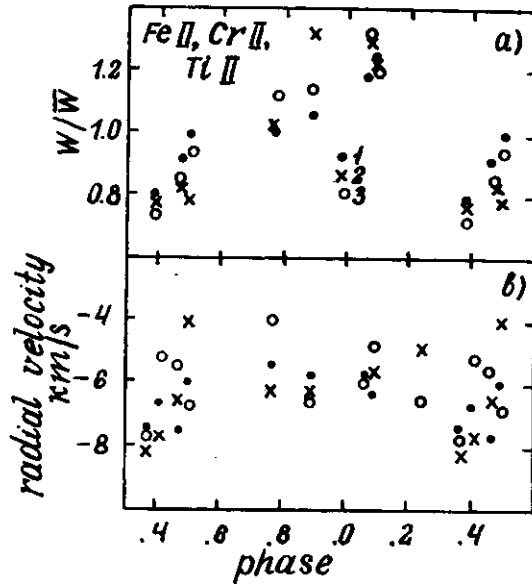


Fig. 1. a) The equivalent width variations versus phase for lines of 1) Fe - closed dots (●), 2) Cr - crosses (x) and 3) Ti - open dots (○); b) Radial velocity measurements versus phase for the same ions.

It becomes clear from the Figures that variations are not large - their amplitudes change about 1.5-2.0 times. All studied variations are in phase.

The accuracy of the averaged for the different elements radial velocities is about 3km/s. The radial velocity changes for Fe, Cr, Ti and Sr are shown in the Figures 1b and 2b. The obtained amplitudes are not larger than the accuracy. This fact does not permit to make reliable conclusions. The average of these measurements gives the radial velocity of HD5797 -6.2 ± 1.3 km/s.

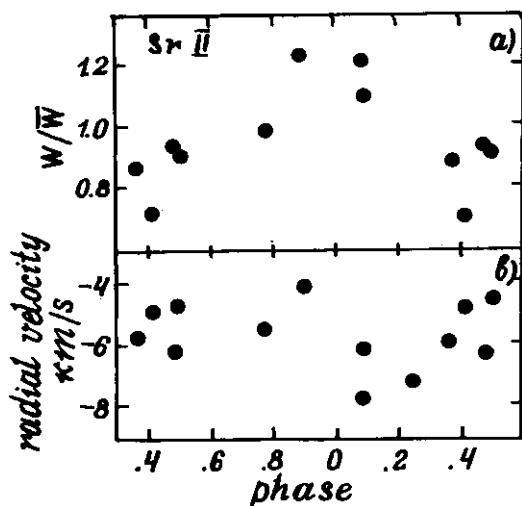


Fig. 2. a) The equivalent width variations of SrII lines versus phase; b) The radial velocity measurements for the same line.

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