SOME STRUCTURAL FEATURES OF MAGNETIC FIELDS OF THE CHEMICALLY PECULIAR STARS β Cr B AND α^2 CVn.

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In spectra of chemically peculiar (CP) stars the weak lines originate at very different levels on the both sides of the Balmer jump (λ_B= 3646 A): $\tau \approx 0.01$ at $\lambda < 3646$ Å and $\tau \approx 0.5 - 1.0$, when $\lambda > 3646$ Å (Khokhlova,1978).

To estimate the radial gradient of the magnetic field, we have observed two CP-stars β Cr B and α^2 CVn from 1979 to 1984 on the 6-meter telescope with an achromatic circular polarization analyzer (Glagolevskij et al.,1978). Compared with classical Zeeman analyzers,whose working wavelength band is only 300 Å, the achromatic analyzer covers a wide spectral region,enabling many more lines to be measured.

A combination of camera and grating was chosen so as record the 3300 - 4000 Å region all on the same plate at the 6.7 A/mm dispersion. Since the lines used to measure the field on either side of λ 3646 Å are exposed simultaneously on a single plate, one avoids many of the systematic errors arising from various positional,photometric and polarization effects, all these should influence the short and long wave ends of the spectrogramm identically.

Results of measurements.

1. Phase curves for the magnetic field variation of the CP-star β Cr B in two spectral regions are given in Fig.1. The best agreement between our observations and Wolff's data (1978) we see in case of phase shift of our observations by 0.1 of the period. Probably,the cause of all these disagreements is that the β Cr B is a binary star (Balega et al.,1984). We confirm the phase shift of the extrema of positive polarity by 0.15,discovered by Wolff.

2. For the star α^2 CVn we can see another picture in the properties of magnetic fields wich are measured using lines shortward (B_e^{3500}) and longward (B_e^{3800}) of the Balmer jump. The value of the magnetic field and its

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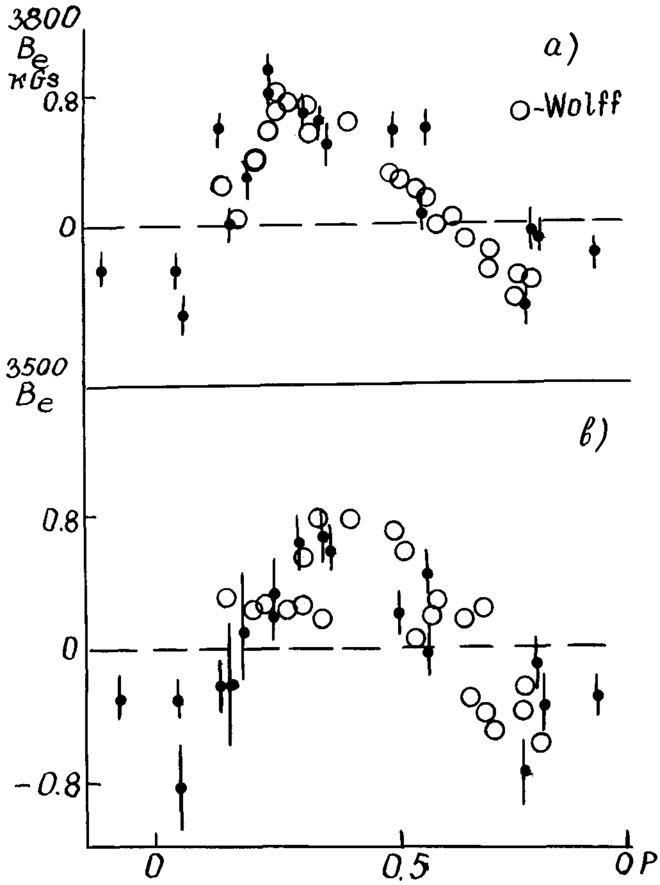

Fig.1

variation amplitude are weaker in the spectral region with $\lambda < 3646$ Å. This can be strengthening into the interior of $\alpha^2 CVn$ atmosphere at a rate of about 1 gauss/km (Fig.2). The field measurements, carried out separately from the iron lines (Fig.3a,b) and the chromium lines (Fig.4a,b) indicate a weakening of a strength of the magnetic field shortward of the Balmer jump.

A very large difference appears at the measurements of chromium lines, and at the same time, the magnetic field measurements from the titanium lines show similar variations from the different sides of Balmer jump. Neither instrumental nor measurement errors can be the cause of these differences. A comparison with the maps of iron, chromium and titanium (Fig.3c,4c,5c, respectively) in the surface of the $\alpha^2 CVn$ (Pavlova and Khokhlova, 1984) shows that, probably, there is a connection between the position of a spot of anomalous chemical composition relative to

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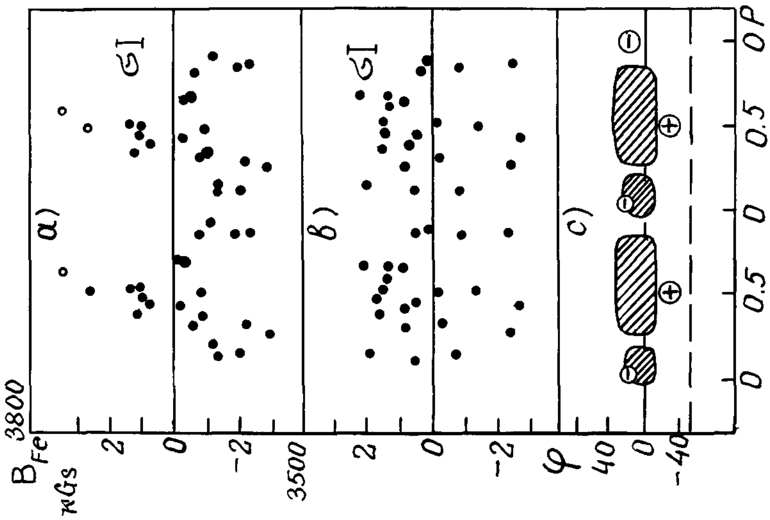

Fig.3

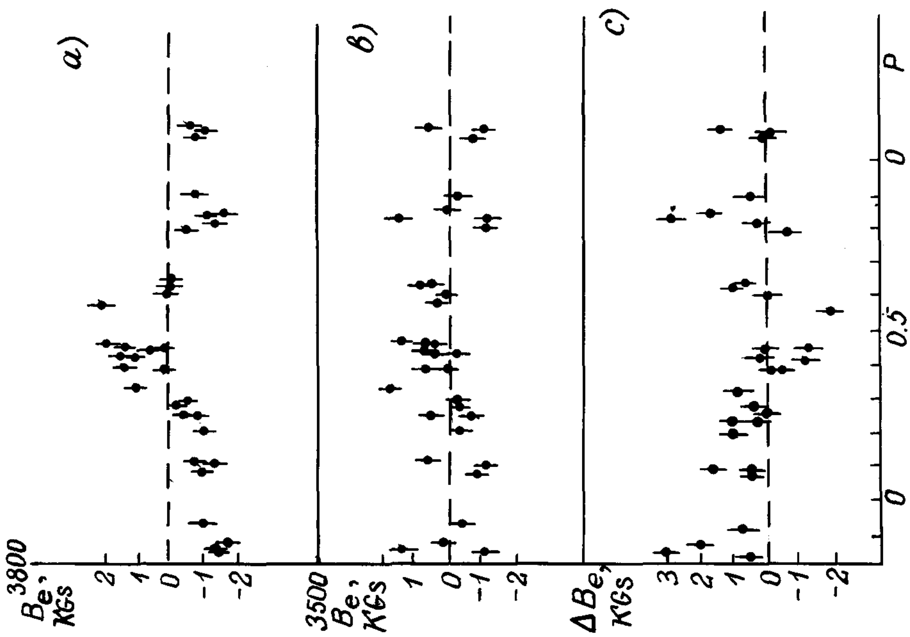

Fig.2

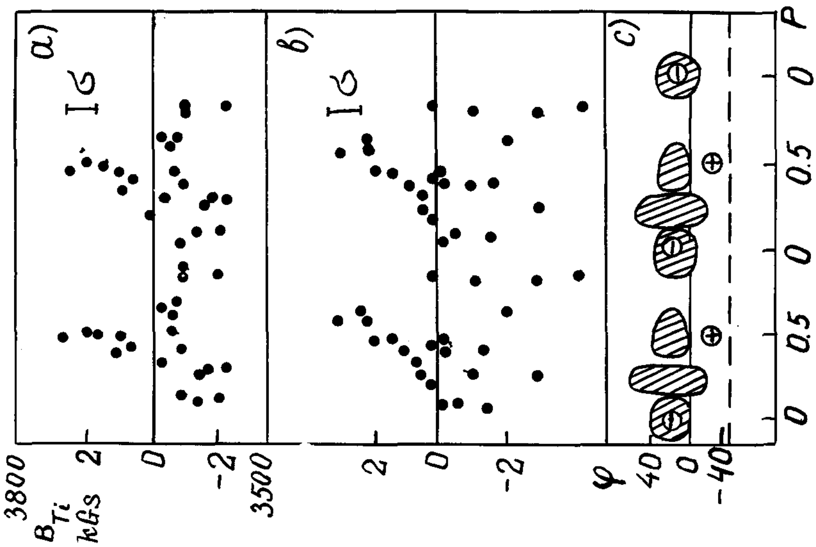

Fig.5

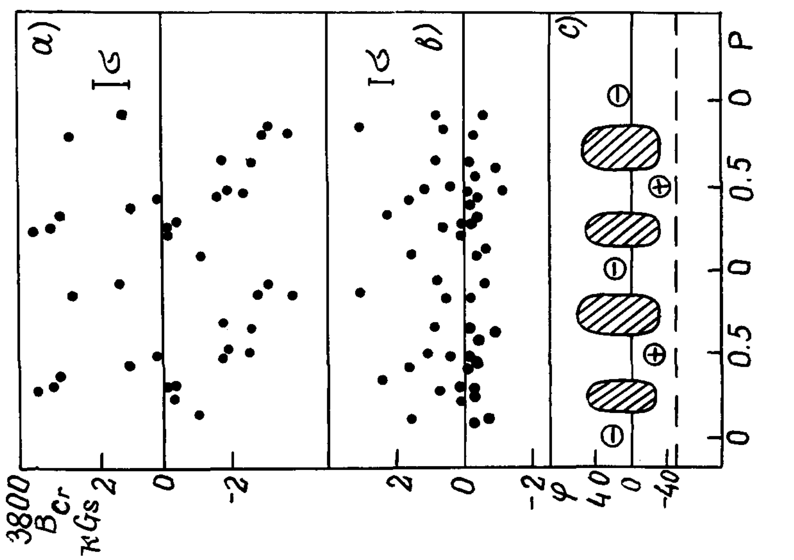

Fig.4

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the pole of dipolar magnetic field and the value of radial gradient;when the spot coincides with the pole of dipolar magnetic field,there is no radial gradient,and if there are no spots on the poles,then the differences appear in the value of the magnetic field on both sides of Balmer jump. If we observe the radial gradient of magnetic field and since the values measured are averaged over the whole stellar surface,appreciably larger local gradients might well exist enougth to trigger the mechanism of magnetic element differentiation (Babcock,1963).

More detailed discussion of those problems are presented in other author's papers (Romanyuk,1984,1986).

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