

POLARIZATION IN CH CYGNI DURING QUIET AND ACTIVE PHASES

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Our wide-band polarimetric observations of CH Cyg began in 1974 and continued in 1976 and 1984. During the first two observational seasons the star was in quiet phase between two outbursts, in 1984 the latest outburst that began in 1977 was declining. Figure shows mean values of the degree of polarization P and the position angle θ for the different observational periods. Standard errors calculated by photon noise statistics are 0.02-0.04% for P and 1-5% for θ .

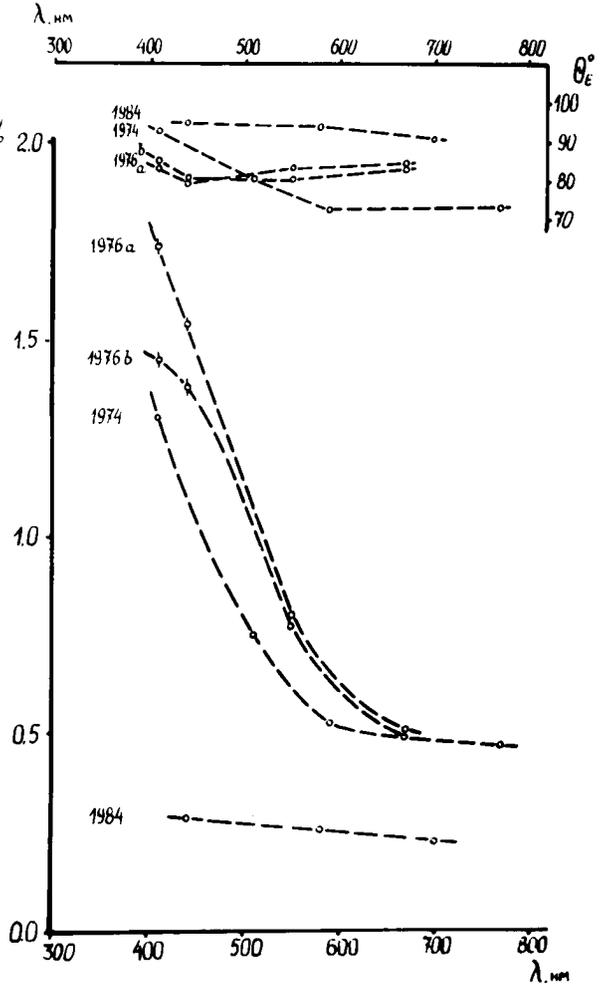
In 1974 (October 12 - December 1) polarization parameters did not change significantly. Sharp increase of the degree of polarization in the shortwave region of the spectrum and change with wavelength of the degree of polarization are typical for many cool luminous stars and indicate existence of an asymmetric circumstellar envelope around CH Cyg. Interstellar polarization in the direction of CH Cyg should be quite small [1,2], as its distance is 330 pc and colour-excess E_{B-V} does not exceed 0.07^m.

In 1976 (September 22 - October 10) wavelength dependence of the degree of polarization remained the same as it was in 1974, but the value of P in the shortwave region was larger. Orientation of the position angle differs also from that in 1974, but there is no rotation of θ . After October 1, 1976 the degree of polarization diminished in all the filters, specially at shorter wavelengths, though the brightness of the star in the same spectral interval remained constant at 0.01^m level. Mean values of P and θ for the both periods - before and after October 1 - are shown in Fig. (curves 1976a and 1976b respectively). Observations by Khudyakova [1] make it possible to prolong the degree of polarization curve into near infrared. It comes out that for the quiet state of the star P was at the level of 0.5% in the interval from ~ 600 to 900 nm.

In the course of the period of activity set in after the 1977 outburst polarization in CH Cyg had quite

different nature. According to Pirola's data (2,3) that refer to the initial stage of star's activity, P_{pol} the degree of polarization varied within a large range - from 0.04 to 0.7% in red and near-IR, and from 0.3 to 1.6% in the UV. On an average it was lower than in the quiet state, position angle changed also. According to our data, in 1984 (Sept.22-Oct.8) the degree of polarization diminished yet more, its wavelength distribution did not display the rise in the UV observed earlier, position angle was practically the same in all the wavelengths (see Fig.); statistically reliable variations in the value of P from night to night were observed.

Drastic decrease of the degree of polarization in the UV in 1984 comparing with 1977-1979 should be related to weakening of blue continuum. This agrees with the observed correlation between UV flux and UV polarization (2) and indicates that a significant part of polarization at active stage is caused by additional hot radiation source. Nevertheless during the quiet stage, before the outburst, high degree of polarization in the short wave region obviously had different nature, and, as it is in the case of other cool giants, that polarization should be produced by light scattering on dust particles in the circumstellar envelope around CH Cyg.



REFERENCES

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2. Piitola, V. 1981, *Astrophys. Lab. Univ. Helsinki Report* 2/1981, 127.
3. Pirola, V. 1983, in *Cataclysmic Variables and Related Objects*, IAU Colloquium 72, 211.