PERIODIC VARIATIONS IN THE SPECTRUM OF THE DWARF NOVA WX HYI IN OUTBURST AND MINIMUM

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ABSTRACT.

We present the analysis of spectrograms obtained during quiescence and during an ordinary outburst of the SU UMa type dwarf nova WX Hyi (ESO 3.6m telescope, B&C spectrograph with Image Disector Scanner, 171 $\mathring{A}mm^{-1}$, range 4000-7000 $\mathring{A}$, time resolution 6min.). The radial velocities of these spectra have been discussed by Schoembs and Vogt (1981) who also derived the orbital elements of WX Hyi. The phases ϕ_{max} refer to these elements. All velocities discussed here are with respect to the white dwarf, not to the center of mass of the binary system.

In quiescent state we did not find significant radial velocity variations. The equivalent widths W_λ of the He I emission lines revealed periodic variations with an amplitude of ≈30%, maximal values of W_λ were observed at ϕ_{max} = 0.0... 0.2. In contrast, the equivalent widths of the Balmer lines were not variable.

During outburst we found periodic radial velocity variations of the emission peak of Hα, Hβ and He I 5875 with an amplitude of ≈100 km s^{-1}, $\phi_{max} \approx 0.5$. Also the broad Balmer absorption lines revealed periodic radial velocity variations, with a similar amplitude (ϕ_{max} = 0.3...0.5). The equivalent width of the Hα central emission peak varies with an amplitude of ≈30%, $\phi_{max} \approx 0.85$. No variations of the equivalent width of the Balmer absorption lines were found.

The outburst observations suggest that the preceeding part of the disc is brighter than the following one (in orbital motion). This is probably due to heating of the preceeding part by collisions with circumbinary matter, which seems to have an enhanced density in outburst as compared to the quiescent state. The emission lines are formed in outer layers or in a halo around the disc. The equivalent width variations can be interpreted in terms of interactions between this halo and the optically thick part of the disc.

A more detailed discussion of the data is being published elsewhere.

Reference

Schoembs, R., Vogt, N.: 1981, Astron. Astrophys. 97, 185.

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