

Spectroscopic variability of two Oe stars

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The two Oe stars HD 45314 and HD 60848 have recently been found to exhibit very different X-ray properties: whilst HD 60848 has an X-ray spectrum and the emission level typical of most OB stars, HD 45314 features a much harder and brighter X-ray emission, making it a so-called gamma Cas analogue. Monitoring the optical spectra could provide hints towards the origin of these very different behaviours. We analyse a large set of spectroscopic observations of HD 45314 and HD 60848, extending over 20 years. We further attempt to fit the H-alpha line profiles of both stars with a simple model of emission line formation in a Keplerian disk. Strong variations in the strengths of the H-alpha, H-beta, and He I 5876 emission lines are observed for both stars. In the case of HD 60848, we find a time lag between the variations in the equivalent widths of these lines, which is currently not understood. The emission lines are double peaked with nearly identical strengths of the violet and red peaks. The H-alpha profile of this star can be successfully reproduced by our model of a disk seen under an inclination of 30 degrees. In the case of HD 45314, the emission lines are highly asymmetric and display strong line profile variations. We find a major change in behaviour between the 2002 outburst and the one observed in 2013. This concerns both the relationship between the equivalent widths of the various lines and their morphologies at maximum strength (double-peaked in 2002 versus single-peaked in 2013). Our simple disk model fails to reproduce the observed H-alpha line profiles of HD 45314. Our results further support the interpretation that Oe stars do have decretion disks similar to those of Be stars. Whilst the emission lines of HD 60848 are explained well by a disk with a Keplerian velocity field, the disk of HD 45314 seems to have a significantly more complex velocity field that could be another signature of the phenomenon that produces its peculiar X-ray emission.

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