Astronomy in Focus - XXX
Proceedings IAU Symposium No. XXX, 2018
M. T. Lago, ed.

doi:10.1017/S1743921319003855

Doppler images of V1358 Ori

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Abstract. We present Doppler images of the active dwarf star V1358 Ori using high-resolution spectra from the NARVAL spectropolarimeter mounted on the Bernard Lyot Telescope. The spectra were taken between 09-20 Dec, 2013 with a resolution of R=80000. Doppler imaging was carried out with our new generation multi-line Dopper imaging code iMap (Carroll *et al.* 2012). 40 individual photospheric lines were selected by line depth, temperature sensitivity and blends. Two data subsets were formed to get two consecutive Doppler images. Prominent cool spots at lower latitudes are found on both maps. At 0.5 phase there is a prominent equatorial feature on both maps. Weaker polar features can be seen on the first map, which somewhat diminishes for the second map. On the first image there is a cool surface feature at 30 degrees latitude which seems to fade greatly on the second map. Around 0.75 phase, a new spot seems to form. These changes suggest a rapid surface evolution. Spot displacements may also indicate surface differential rotation, which was derived by cross-correlating the two subsequent Doppler images (see e.g. Kővári *et al.* 2012). We fit the latitudinal correlation peaks with a sine-squared law. The fit suggests solar-type surface differential rotation with a shear parameter of $\alpha = 0.02 \pm 0.02$. The shear parameter fits the $P_{\rm rot} - |\alpha|$ diagram in Kővári *et al.* (2017) quite well.

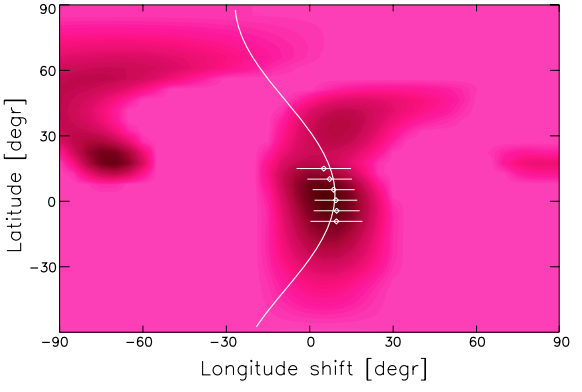

Figure 1. Cross correlation map derived with ACCORD. Dots indicate the best correlation on each 5 degree latitude strip. The minima are fitted with a sine-squared law, resulting in $\alpha = 0.02 \pm 0.02$.

References

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