Silicon Spots on the Star HD 22920

Mathieu Perron-Cormier, Université de Moncton
Supervisor(s): Khalack, Viktor
Other authors: Khalack, Viktor; Kashko, Pavlo; Kobzar, Oleksandr and Tvardovski, Dmytro

Previous analysis of the chemically peculiar star HD22920 has revealed signs of vertical stratification of silicon abundance in its atmosphere. Using photometric data of TESS for HD22920 we have detected a variability of light curve with the period 3.96 ± 0.01 days. We have analysed 10 high SNR spectra of HD22920 acquired with the spectropolarimeter ESPaDOnS at the CFHT. By fitting the silicon line profiles with the Voigt profiles we have estimated value of radial velocity for each studied spectrum. The detected variability of studied line profiles indicates that silicon abundance also shows a horizontal stratification forming overabundance patches in stellar atmosphere of HD22920. The measured radial velocities vary with a period similar to the one found from the analysis of light curve. We assume that this period corresponds to the period of stellar rotation. Presence of magnetic field in this star, confirmed from the analysis of Stokes V spectra, can supress the convection and amplify atomic diffusion leading to horizontal and vertical stratification of silicon abundance. As the star rotates the visibility of overabundance patches changes causing observed variability of flux and radial velocity.