

Poster

Splinter HiRes

UMBRAL SUNSPOT SPECTRA OBSERVED WITH LARS COMPARED TO  
COOL STARS

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Compared to the Quiet Sun, sunspot umbrae yield a much more complex spectrum consisting of atomic and especially molecular lines. By the lack of magneto-convection the temperature in the umbra is decreased by up to 2000 K. To gain information about the umbra observed with the Laser Absolute Reference Spectrograph (LARS) at the Vacuum Tower Telescope (VTT) on Tenerife, we compare the high-resolution umbral spectrum with additional cool star spectra recorded with the High Accuracy Radial velocity Planet Searcher (HARPS). For the spectral region around 538 nm we find a high correlation between the umbral spectrum and late K and early M dwarf stars. By applying a weak field approximation to the strong magnetically sensitive Fe I lines in the spectral range, we estimate the magnetic field strength in the dark umbra to around 3000 G. In conclusion, we were able to indirectly estimate the temperature and chemical composition in the sunspot umbra based on star spectra. Future multi-instrumental studies of the high-accuracy instruments LARS and HARPS will allow a deeper insight into molecular investigations.