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Title: Modeling nIR spectra of M dwarfs with `ZeeTurbo`

Abstract: M dwarfs are the most numerous stars in the solar vicinity, and play a key role in the hunt for habitable exoplanets. Constraining the atmospheric parameters of these stars is crucial to understand their formation, evolution, and to study planets orbiting them. The characterization of M dwarfs is challenging, however, because of their intrinsic faintness and the complexity of their atmospheres. Furthermore, these stars host magnetic fields, at the origin radial-velocity jitters, and affecting stellar line shapes. In this talk, I discuss the results of a study aimed at characterizing M dwarfs from high-resolution near-infrared spectra recorded with SPIRou, the spectropolarimètre infrarouge installed at the Canada-France-Hawaii Telescope. Relying on state-of-the-art `MARCS` model atmospheres, we computed synthetic spectra of magnetic targets with our new tool, `ZeeTurbo`, obtained by including the Zeeman effect and polarized radiative transfer capabilities to `Turbospectrum`. With this new tool, we developed a process to simultaneously constrain the average magnetic field, effective temperature, surface gravity, metallicity and alpha-enhancement of M dwarfs, by fitting synthetic spectra to high signal-to-noise ratio SPIRou spectra. We validate our method through simulations, and analyze 6 magnetic targets observed in the context of the SPIRou Legacy Survey (SLS), providing estimates of their atmospheric parameters and average magnetic field strengths in good agreement with the literature. `ZeeTurbo` provides the basis for ongoing and future projects aimed at studying magnetic fields of M dwarfs and pre-main-sequence stars.