
Characterizing stellar parameters from high resolution spectra of cold/young stars for SPIRou legacy survey

Logithan Kulenthirajah^{*1}

¹Institut de recherche en astrophysique et planétologie (IRAP) – Université Paul Sabatier - Toulouse 3, Observatoire Midi-Pyrénées, Centre National de la Recherche Scientifique : UMR5277 – France

Abstract

Having well constrained stellar parameters is essential for deducing the properties of planets and magnetic field from radial velocity and polarimetric data. Stellar parameters for F-G-K stars can be directly estimated by comparing observations to a stellar spectral library with a reliable estimation tool. But for M dwarfs, existing stellar spectral libraries struggle to account for observed molecular lines accurately. We propose to create a high resolution spectral library in the optical and infrared range with PHOENIX model atmospheres code that can precisely compute molecular lines. The chosen grid of stellar parameters will be as follow: $dT_{\text{eff}} = 25\text{K}$, $d\log g = 0.05$, $d[M/H] = 0.05$, ranging between: $T_{\text{eff}} = [2500-4000]\text{K}$, $\log g = [4.0-5.5]$, $[M/H] = [-1 - 1]$. This spectral library used along with Bayesian estimation tools/OLS will accurately characterize stellar parameters of the main sequence (MS), low-mass stars of masses 0.1-0.5 solar mass and later on the parameters of the pre-main sequence (PMS) stars of masses 0.3-1 solar mass. This work is an essential step in the preparation of the scientific exploitation of the new high-resolution near-IR velocimeter and polarimeter SPIRou which will be installed on the Canada-France-Hawaii-Telescope (CFHT) in 2017.

Keywords: Stellar parameters, cool stars, mdwarf, spectral library

^{*}Speaker