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Measuring the mean densities of close-in planets orbiting pre-main-sequence (PMS) stars is crucially needed by planet formation and evolution models. This requires to measure both planet radii, from the depth of their transit light curves, and masses, from the radial velocity (RV) wobbles induced by the planet on its host star. However, PMS stars exhibit intense magnetic activity responsible for fluctuations in both photometric and RV curves that are much stronger than planet signatures. As a result, **no close-in planet younger than 25 Myr has a well-constrained bulk density**.

AU Microscopii (AU Mic) is a nearby active 22-Myr old M1 star around which a close-in transiting planet was recently detected from TESS and Spitzer light-curves (Plavchan et al., 2020). Despite velocimetric follow-ups in the optical domain, the authors reported no more than an upper limit for the planet mass due to the large dispersion induced by stellar activity in their RV time-series. The high stellar brightness, and the expected decrease in the amplitude of stellar activity RV signals from the optical to the near-infrared domains, **makes the nIR (*YJHK* bands) spectropolarimeter SPIRou (Canada-France-Hawaii Telescope, atop Mauna Kea) the ideal instrument to measure the mass of AU Mic b.**

In this study, we present a spectropolarimetric and velocimetric analysis of 27 observations of AU Mic collected with SPIRou from September to November 2019. The dispersion of our RV time-series is about 45 m/s, ~2.5 times lower than that obtained in the optical domain. We jointly model the planet and stellar activity components of the RV data set, resulting in **a 3.5σ detection a close-in transiting planet AU Mic b, with an estimated mass of 16.7 +/- 4.9 Earth mass, implying a Neptune-like bulk density of 1.3 +/- 0.4 g/cm³.** A consistent detection of the planet is independently obtained by simultaneously reconstructing the surface brightness of the star and estimating the planet parameters using Zeeman-Doppler imaging (ZDI). Using ZDI, we invert our

intensity and circularly-polarized spectra into surface brightness and large-scale magnetic field, resulting in **a mainly poloidal and axisymmetric field** of 475 G, dominated by a 450 G dipole tilted at 19° to the rotation axis towards phase 0.2. Moreover, we find that the large-scale magnetic field is sheared by solar-like differential rotation of 0.167 rad/d, t**wice as large as that shearing the spot/plage distribution.** Finally, we compute various indicators of the stellar activity and study their rotational modulation and correlation with RVs. We find that t**he bisector inverse slope and small-scale magnetic field correlate best with the stellar activity RV signal.** Surprisingly, chromospheric indices based on Helium I (HeI, 1083 nm) and Paschen Beta (PaB, 1282 nm) probe different regions of the stellar disc, HeI being mostly emitted around the magnetic equator while PaB emission is linked to the magnetic pole.

AU Mic b already appears as a prime target for constraining planet formation and evolution models. Moreover, the interactions between the planet and the debris disk surrounding the system could give rise to promising synergies between photometric, spectroscopic and imaging techniques. Finally, AU Mic b is a primary candidate for an atmosphere characterization and, potentially, the detection of an extended H/He exosphere around AU Mic b with upcoming space- and ground-based missions.