

Title : The lowest mass giant planet ever imaged around a star

Understanding planetary systems formation and evolution has become one of the challenges in astronomy, since the discovery of the first exoplanet around the solar-type star 51 Peg in the 90's. While more than 800 planets (mostly giants) closer than a few AU have been identified with radial velocity and transit techniques, very few have been imaged and definitely confirmed around stars, at separations below a hundred of astronomical units. Direct imaging detection of exoplanet is indeed a major frontier in planetary astrophysics. It surveys a region of semi-major axes (> 5 AU) that is almost inaccessible to other methods. Moreover, the planets imaged so far orbit young stars; indeed the young planets are still hot and the planet-star contrasts are compatible with the detection limits currently achievable, in contrast with similar planets in older systems. Noticeably, the stars are of early-types, and surrounded by debris disks, i.e. disks populated at least by small grains with lifetimes so short that they must be permanently produced, probably by destruction (evaporation, collisions) of larger solid bodies. Consequently, every single discovery has a tremendous impact on the understanding of the formation, the dynamical evolution, and the physics of giant planets.

In this context, I will present our recent discovery of one faint companion to a nearby, dusty, and young A-type star (at 56 AU projected separation). Background contaminants are rejected with high confidence level based on both astrometry and photometry with three dataset at more than a year-time-laps and two different wavelength regimes. From the system age (10 to 17 Myr) and from model-dependent luminosity estimates, we derive mass of 4 to 5 Jupiter mass. This planet is therefore the one with the lowest mass ever imaged around a star. Given its orbital and physical properties, I will discuss the implication on its atmosphere with respect to other imaged companions but also on its formation which is not straightforward assuming standard mechanisms. This planet will be of great interest for future planets imagers to search for additional close-in and lower mass companions but also for spectral characterization.

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