

Jeudi 8 février 2024 à 11h (IAS, bâtiment 121, salle 1-2-3)

How gravitational microlensing constrains models of planet formation

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The Galactic Bulge Time Domain Survey of the NASA Nancy Grace Roman Space Telescope (launch in 2026/2027, formerly called WFIRST) will use the gravitational microlensing method to detect more than 1000 planets with masses as low as Mars mass around G, K and M stars. The high resolution capability and high precision photometry of the telescope will also yield the mass measurements of ~ 700 such planets and their host stars during its prime mission. In this talk, I will present the physical concepts and observational techniques behind this space survey, using results already obtained from the ground, including from follow-up observations of microlensing events that enable the mass measurement of cold exoplanets on wide orbits (~ 0.5 -10 AU). Past microlensing surveys have measured the planet-to-host star mass-ratio function of the cold exoplanets in the Milky Way. When compared to predictions from planet population synthesis models, these observational results question some stages of the models of giant planet formation. After discussing these results, I will present an ongoing program aiming at converting the aforementioned 'mass-ratio function' into a 'mass function' which is expected to provide new insights and constraints on the abundance of cold exoplanets, its dependence to the host-star mass and location in the galaxy.