
From super-Earths to brown dwarfs: the planet-diversity revolution

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Abstract

The mass of an exoplanet is the most fundamental parameter. Knowing the mass of an exoplanet allows to know its nature (e.g. giant, Neptune-like, super-Earth, etc...). Combined with the radius measurement from photometric transits, it is possible to determine the planet's bulk density, then used to constrain its internal structure. The space-based photometric surveys CoRoT and Kepler detected thousands of potential transiting planets for which various techniques (e.g. velocimetry, TTVs, ...) have been used to both establish their nature and constrain their mass. In this talk, I will review the main achievements that have been made thanks to the CoRoT and Kepler space missions in terms of planet diversity, through the entire mass-radius diagram (from super-Earths to brown dwarfs). I will then discuss the limitations encountered in confirming and characterizing most of the transiting planet candidates detected by CoRoT and Kepler, especially in the low-mass regime. I will present the solutions used to validate the nature of those candidates needed to determine the occurrence rate of exoplanets.

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