
Brown dwarfs versus exoplanets: two different mass functions

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Abstract

Very low-mass stars including brown dwarfs are likely to have a completely different mass function from that of exoplanets due to different formation processes, one being gravitational fragmentation (declining log-normal) and the other being collisional coagulation (rising power law). Observational evidence for two non-overlapping processes and mass functions is the presence of a brown dwarf desert. We discuss ideas how to predict the planetary mass function which we model as a convolution of the planetary object mass distribution in protoplanetary disks (a function of stellar mass) and the mass function of stars in which planets can form. We assume that planets can only arise in disks around stars between a minimum ($\sim 0.3M_{\odot}$) and maximum mass ($\sim 3.0M_{\odot}$). We realize we are speculating here, but with this contribution we want to stimulate discussion about the planetary mass function, which should also depend on the heavy element abundance (i.e. dust/gas ratio) in galaxies.

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