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Microlensing surveys suggest giant-planet growth halts at 2% of host mass

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Microlensing surveys are sensitive to giant planets on 1—10 au orbits typically around 0.05–0.8 solar-mass hosts. In Zhang (2025; ApJL 995, L55), I performed a statistical analysis of ~80 giant planets detected by microlensing. I show that there exists a statistically significant truncation to the giant-planet mass-ratio distribution at q~0.02, above which the occurrence rate density sharply declines by around an order of magnitude. Moreover, there exists an extended mass-ratio desert at q~0.02–0.05, which implies that the canonical Brown Dwarf Desert (BDD) is fundamentally a feature in the mass ratio. Previous works have found that companions below the BDD preferentially orbit metal-rich stars and are themselves metal enriched. In this context, q<0.02 companions are likely formed via core accretion whereas q>0.05 companions are likely formed via gravitational instability. This supports q<0.02 as a working definition of exoplanets based on the mass ratio independent of the deuterium burning limit.

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