

MOA 2010-BLG-477Lb: Constraining the Mass of a Microlensing Planet

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Abstract: Microlensing detections of cool planets through the channel of high-magnification events are important for the construction of an unbiased sample to estimate the frequency of planets beyond the snow line where giant planets are thought to form according to the core accretion theory of planet formation. Here, we report the discovery of a giant planet detected from the analysis of the light curve of a high-magnification microlensing event MOA 2010-BLG-477. The measured planet-star mass ratio is $q = (2.158 \pm 0.004) \times 10^{-3}$ and the projected separation is $s = 1.1244 \pm 0.0006$ in units of the Einstein radius. The angular Einstein radius is unusually large $\mu E = 1.38 \pm 0.11$ mas. Combining this measurement with constraints on the "microlens parallax" and the lens flux, we can only limit the host mass to the range $0.13 < M/M_{\odot} < 1.0$.