

The Physics and Space Sciences department present:

Kepler, Microlensing, and Direct Imaging:



New Constraints on Exoplanet Formation Theories

Doppler and ground-based transit searches have discovered about 800 exoplanet candidates to date. These discoveries have generally supported the core accretion mechanism for giant planet formation. However, more recent discoveries have raised questions about the core accretion mechanism as the sole mechanism for exoplanet formation. NASA's Kepler space telescope has detected over 2326 exoplanet candidates, with many of these candidates occupying an oasis in discovery space that was predicted to be a desert on the basis of population synthesis models based solely on core accretion. Similarly, ground-based microlensing surveys, as well as direct imaging detections, have demonstrated the existence of significant numbers of giant planets on orbits wide enough to be difficult to explain purely by core accretion. These new constraints on planet formation theories suggest that future population synthesis models need to consider hybrid formation mechanisms, where at least some of the giant planets are formed by the disk instability mechanism, coupled with the formation of rocky planets, hot and cold super-Earths, and some giant planets by the traditional core accretion mechanism.



Alan Boss
DTM, Carnegie Institution

Friday, January 25th

4:00–5:00 PM

OPS Room 140