

APR11-2011-020112

Abstract for an Invited Paper
for the APR11 Meeting of
the American Physical Society

Catching Shadows: Kepler's Year-Two Transit Census

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Launched in March, 2009, NASA's Kepler Mission is poised to determine the abundance of earth-size planets in the Galaxy. The project has hosted two major data releases, providing the astronomical community with four months of nearly continuous, high-precision photometry of all stars targeted as part of the Kepler planet search. A catalog of nearly 1,000 stars with transiting planet candidates, more than 70% of which are smaller than Neptune, accompanied the data release (Borucki et al. 2011). Ground-based follow-up observations, transit timing observations, and blend analyses have all played a major role in validating the planet interpretation, leading to major mission milestones such as the discovery of Kepler's first rocky planet, Kepler-10b, and the discovery of six transiting planets orbiting the same star, Kepler-11. Multiple transiting planet candidate systems are abundant in the released data. Dynamical studies suggest that the false-positive rate for these systems will likely be less than 10%, and the potential for determining planet masses via transit timing variations hold much promise for confirming the smallest planet candidates. I will present an overview of Kepler's recent discoveries and our progress towards the ultimate objective which is to determine the frequency of habitable, earth-size planets.