UNIFORM MODELING OF KEPLER OBJECTS OF INTEREST

Jason Rowe
SETI Institute

The central objective of the proposal is perform uniform state-of-the-art lightcurve modeling with Kepler's list of planetary candidates (KOIs). This process includes modeling of planetary transits, phase curves and providing orbital solutions. We will use Kepler-photometry and other groundbased observables to determine key planetary parameters such as the radius and mass. More importantly, we will also determine posterior probability distributions for the fitted parameters by employing a Markov chain Monte Carlo algorithm. Our algorithms have already been tested and published for various Kepler planet- discoveries. We wish move from modeling a single system at a time, to batch processing the entire Kepler planetary candidate catalog. Our plan to then generate a catalog of model parameters for each KOIs and make this catalog readily available to the Kepler Science Team and collaborators on an annual basis. We also wish to make the catalog public on a timescale that coincides with Kepler public data releases. By calculating detailed models of the Kepler targets, our work will help support the Kepler Mission to achieve many of its primary scientific goals. We expect to measure with uncertainties: orbital periods, planet radii, inclinations, reflection/emission from the planet, the amplitude of planet-star graviational interactions and transit timing variations. When sufficient groundbased radial velocities are available we will also model orbital solutions and planetary densities. We will also model multi-planet systems where multiple planets are seen transiting a star.