**DETAILED MODELLING OF EXTRASOLAR PLANET TRANSIT OBSERVATIONS AS A KEPLER PARTICIPATING SCIENTIST**  
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The Kepler Mission will provide ultra high quality photometric observations that will allow a rich and detailed investigation of extrasolar planets and their host stars. The primary goal of the Mission is reconnaissance: to gather statistics and characteristics such as frequencies, sizes, and orbital distributions of Earth-size extrasolar planets and determine correlations with the properties of their host stars. The PI proposes to analyze a subset of the Kepler observations -- the short-period systems -- at a level that is impossible to do for a large set of systems. These short-period systems will be scrutinized with painstaking attention to detail. This narrow focus adds a strong complement to the broader Kepler Mission objectives. In particular, the set of products that will be generated include: (1) precise transit timings (to be used by the Kepler Science Team to detect other bodies for example); (2) accurate system parameters for the planet and host star (e.g. relative radii); and (3) characterization of photospheric "texture" and its effect on the transit light curves (i.e. mapping photospheric features). The PI of this proposal is well--versed in skills relevant to this research, including periodic and aperiodic time series analysis, binary star research, high--speed photometry, and in particular, extrasolar planet transit modelling. Along with Fourier, auto-regressive, correlation, and other similar general tools, the eclipse modelling software ``ELC'' will be the primary tool employed by the PI. ELC will be improved to take full advantage of the unprecedented level of precision of the Kepler light curves. Thus a fourth product will be generated: (4) the enhanced ELC code will be made available to all Kepler Science Team members. Through the Kepler Participating Scientist Program the PI will become a member of the Kepler Science Team, enabling him to add his expertise and directly contribute to the Kepler Mission.