

Detection of Extrasolar Planets of Eclipsing Binaries in Dense Field Photometric Observations

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The possibilities of photometric observations of eclipsing binary stars in dense fields towards the detection of extrasolar planets are being evaluated. For the transit method, the probability to observe planets around eclipsing binaries is much higher than for single stars. This is based on the assumption, that planetary systems form in the zone of stability around a binary (more than 3-4 times more distant from the binary than the separation between the binary components), and that the alignment of a planetary system's plane is correlated with the binaries' plane. The observations of dense stellar fields (clusters, galactic plane) with large format CCD's allow the simultaneous tracking of the lightcurves of up to dozens of binaries. Although only nearby binaries consisting of low-mass stars allow the detection of terrestrial sized planets from earth-bound observations, giant planets would be detectable over a wide range of distances and stellar masses. We also present results from a study of eclipse minimum timings. Small periodic deviations in these timings would be indicative on the presence of large planets on longer orbits. Photometric time series observations of eclipsing binaries can therefore be analyzed in two ways for the presence of extrasolar planets: transits, which are most sensitive -but not restricted- to short orbital and large-diameter planets, and eclipse minimum timing, which is most sensitive to heavy planets on long orbits.