DETECTION OF EXTRASOLAR PLANETS AROUND ECLIPSING BINARIES IN THE KEPLER FIELD
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About 350 eclipsing binary stars may be found in the NASA Kepler Mission field of view (FOV). We have developed two methods for the discovery of planets around eclipsing binaries -- a matching filter to look at quasi-periodic transit features indicative of a planet in transit across the two moving stars in the background, and a second method using timing of the stellar eclipse minima themselves to see if the stars are being offset by giant planets farther out around a binary-planet barycenter. This last method does not require planetary orbits to be in the line-of-sight orbital plane, and non-detections mean that circum-binary planets of a certain minimum mass are not present. One must know the spectral type and luminosity class of the stars for a determination of the size of the planets (transit) or their projected mass (eclipsing timing). We will use ground-based Stromvil photometry to spectrally classify each eclipsing binary star system, following this with the application of the Wilson-Devinn (WD) eclipsing binary code to determine the exact parameters of the star systems. We have been guaranteed observing time on the 0.9-meter Crossley telescope at Lick Observatory for these observations. We will then apply a well tested matching filter program correlating light curves of the photometric data with generated models of planetary orbits and sizes in order to detect close-in transiting planets at a quantifiable confidence limit. Over a long term we shall then apply the WD code to see if any changes in binary eclipse epochs have shifted in a periodic way, indicative of larger-orbit circum-binary planets. We estimate that hundreds of additional planets may be discovered in the Kepler FOV in this way and that such circum-binary planets will be of significant interest to our understanding of planet formation processes in close binary star systems.