

AN EXTENDED SEARCH FOR CIRCUMBINARY COMPANIONS OF INTERMEDIATE-MASS ECLIPSING BINARY STARS

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There is abundant evidence that stellar companions are more commonplace among the more massive stars, and it is possible that massive star formation processes lead directly to binary and multiple systems as a repository of the angular momentum of the natal cloud. In particular, the formation of a close binary may require the presence of a distant third star to carry the bulk of the angular momentum. Our goal in this proposal is to search for evidence of companions surrounding close eclipsing pairs of intermediate mass, B, A, and F-type stars. Since these close binaries have periods of a few days, the search will focus on dynamically stable outer companions with orbital periods in the range 0.3 to 26 months. We will use precise light curves from Kepler of 40 binaries to measure accurate eclipse timings, and we will search for companions by investigating periodic variations in the times of minima caused by the light travel time across the orbital displacement of the close binary. In favorable situations, we will be able to detect the presence of objects as small as brown dwarf stars and/or massive planets. This work will establish the occurrence of low mass companions among intermediate mass stars. We began this program in Cycle 1 and here we seek an extension through Cycle 2 to double the size of the sample and to search for longer period companions.