

A CALIBRATION STUDY OF VARIABLE STARS IN THE KEPLER FIELD

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We propose to do a calibration study of variable stars in the Kepler Field which will enable us to develop enhanced data products that will support and extend the broad science goals of the Kepler mission. Our primary objective is to produce astronomical-grade light curves for individual stars or ensembles of stars that will complement the detrended light curves produced by the Kepler data pipeline. Relying upon the planned calibration efforts of the Kepler Science Team, we will investigate the possibility of producing contiguous light curves which extend the planned current monthly time base differential light curves to at least a quarterly basis and possibly a time base covering the entire 3.5 year lifetime of the Kepler primary mission. This extended time base capability will support Kepler mission efforts to characterize the nature of the host stars of detected planetary candidates; in particular we will be able to gain better insight to the nature of brightness fluctuations over days to months which might be caused by chromospheric activity due to decades-long activity cycles of stars like the Sun. This calibration effort will place stars with detected transits in the context of the much larger sample of stars lacking transits. Our efforts will extend planned Kepler calibration efforts by analyzing 310 variable stars with known periods, 2 cataclysmic variables, and 32 bright hot stars during the first year of the mission. Nearly all of the variables are reserved Kepler Key Project targets (309 out of 312) but they have brightness fluctuations that exceed one percent in the V band; the remaining 35 stars are not reserved targets. Some of our proposed targets may be requested by other Guest Observer proposals; in that case, we will relinquish those duplicate targets from our target list during the proprietary period.