

MEASURING FLARE RATES AND ENERGIES OF LOW MASS STARS

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M dwarfs are known to exhibit powerful flares due to magnetic reconnection in their atmospheres on timescales from minutes to hours. A previous study of Kepler's Q1 data by Walkowicz et al. (2010) has shown that ~50% of M dwarfs produce flares compared to ~10% in K dwarfs. We propose to observe a set of previously unobserved M dwarfs in the Kepler field-of-view at long (~30 min) cadence to search for and characterize flares. In addition, we propose to observe a small subset of M dwarfs that are known to flare frequently and with short durations to be sampled at short (~1 min) cadence in order to study the fine structure of these flares. We plan to develop a new detection algorithm that will allow us to detect and measure frequencies, durations, and energies of M dwarf flares with this new data as well as with all Kepler data that will be publicly available at that time. This will allow us to examine possible correlations of flares with stellar properties and variability. In addition to increasing our knowledge of M dwarf radiation environments, these results have important implications on exoplanetary habitability.