PILOT STUDY FOR NEW VARIABLE STARS IN THE KEPLER FIELD

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The Kepler mission provides the deepest, complete, high precision photometry with uniform cadence of stars down to the confusion limit of Kp=21. Due to the short lifetime of this mission, it is crucial to use this resource now and take advantage of the unique catalog the spacecraft can obtain. Kepler does not record the whole field and only uses a finite number of masks to observe interesting targets. The precision of the relative photometry is at 4% accuracy at Kp=20. Pre-launch surveys have completeness down to 16-17th magnitude, but our new variable star catalog goes down to the confusion limit. Thus, our catalog will provide a large number of potentially interesting targets for Kepler to observe. This variable star catalog was constructed from the full frame images taken during the commissioning phase of Kepler, and we estimate over 265,000 faint variable stars in the field. Given Kepler's unique capabilities, this survey will provide a unique opportunity to find various variable stars such as eclipsing binaries, pulsators, rotators, and cataclysmic/eruptor stars. We propose a pilot study of 45 stars, all of which demonstrate the most interesting large amplitude variations, to begin this survey.