

Five Known Exoplanets, Maybe More...?

Kepler 2 Field 0 Proposal

Laurence Tognetti and Dr. Darin Ragozzine

Florida Institute of Technology

The ongoing research of planets outside our own solar system continues to amaze scientists, and Kepler 2 will offer an opportunity to continue that research. It will be a great way to continue to learn about how solar systems are formed and maybe even how our own formed, as well.

The Kepler Mission has clearly demonstrated its ability to discover and characterize planets around other stars. **We propose to observe five known exoplanet-hosting stars** to search for other planets and do follow-up research on these known exoplanets and their host stars. Of these five, **four are known transiting exoplanets and we propose that these be observed using Short Cadence**, if possible.

We identified all known exoplanets within 12 degrees of the proposed Field 0 boresight (RA (J2000) = 06^h 47^m 00^s, Dec (J2000) = +21° 22' 47"). The targets for Kepler 2 were chosen because we believe this is a good opportunity to do follow-up research on systems that have been identified to contain extrasolar planets.

The systems for this proposal were identified based on their location within the target area known as Field 0, and were selected by identifying all known exoplanets in the field of view based on the database at <http://www.exoplanets.org>.

One such target of interest is WASP-12 b, which is a known transiting Hot Jupiter with a Period of 1.09 days. This presents a grand opportunity to learn more about how Hot Jupiters are both formed and also maintain their extremely close proximity to their parent star (Ragozzine & Wolf 2009). On the other end of the spectrum is HD 50554 b, which boasts a Period of 1224 days. Observing a transit from this would be highly unlikely for Kepler 2, but the discovery of shorter-period as-yet-undiscovered planets is reasonably high to justify the observations.

The remaining three targets for this proposal (KELT-2A b, HAT-P-20 b, and HAT-P-20 b) are also transiting exoplanets and have Periods just slightly larger than WASP-12 b, but could pose an equally good opportunity to conduct follow-up research and gather new knowledge about these worlds.

We feel the scientific justification for observing these targets is extremely high. The same kinds of excellent science that Kepler has successfully performed on exoplanets around bright stars are possible for these systems. In particular, the four known transiting exoplanets should be observed in Short Cadence mode to maximize the transit timing variation (TTV) and other science possible for such systems. These are the first four listed in the ASCII file. HD 50554b could also potentially be observed in Short Cadence.

Please include the targets in the attached target list to the observational queue.

We thank you for this opportunity to continue the exciting research into exoplanets that Kepler has given to scientists.