Exoplanet Host Star Targets for K2 Campaign 1

Stephen Kane, Natalie Hinkel, Andrew Howard, Jason Wright

The K2 mission holds enormous potential to investigate the stellar properties of known exoplanet host stars in the designated fields. We propose to use the Campaign 1 opportunity to investigate the photometric properties of 5 such stars. We are experienced in performing similar observations as part of the Transit Ephemeris Renement and Monitoring Survey (TERMS). The goal of TERMS is to confirm or exclude the transiting nature of known radial velocity (RV) detected planets. Monitoring known RV planets with bright host stars will provide further opportunities for detecting transiting planets and atmospheric characterization.

The limiting factor for successfully observing a known exoplanet at predicted transit time is often the precision of the transit ephemerides. The quality of a transit ephemeris is determined by (a) the uncertainties associated with the fitted orbital parameters, and (b) the time elapsed since the most recent RV data was acquired. The TERMS project has access to new RV measurements which will allow accurate determination of each planets orbital ephemeris. An example of RV measurements for one of our targets, HD 99492, are shown in Figure 1.

The proposed observations serve three primary purposes:
• To study the variability of bright exoplanet host stars in amplitude and timescale.
• Perform a transit search for the five RV planets. The 17 day orbital period of HD 99492 will allow 4 transits to be observed during Campaign 1.
• To search for transit signatures of additional planets in each system.
• To detect phase variations of the short period planets known to transit.
These observations will also serve as useful cases studies for the bright host stars that will be typical targets for the Transiting Exoplanet Survey Satellite (TESS).

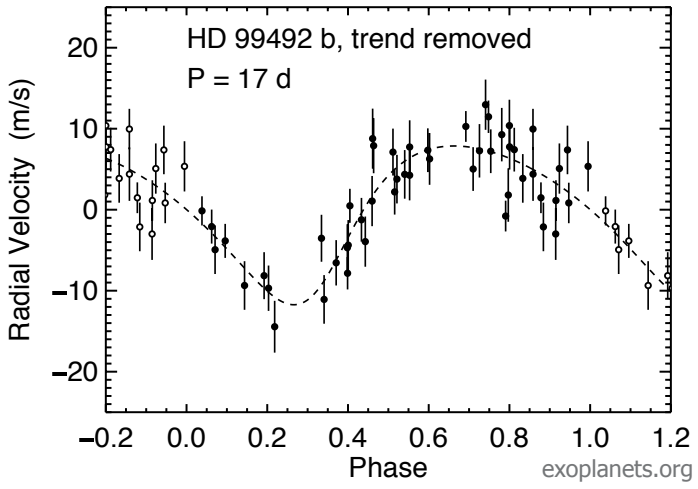

Figure 1: *Current RV observations of HD 99492 which harbors a single planet in a 17 day eccentric orbit. Our additional RV data allows a dramatic improvement in the ability to match orbital phase with predicted photometric signatures.*