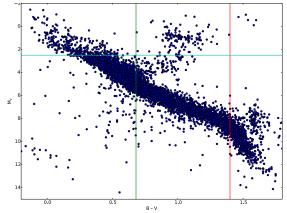# Characterizing Stellar Parameters and Activity of Late G & K stars with K2

Matt Giguere, Debra Fischer, Tabetha Boyajian and Sarbani Basu

Scientific Justification*:* The next generation of high resolution spectrometers (ESPRESSO and EXPRES-0) will deliver an order of magnitude increase in radial velocity precision; however, even the most chromospherically quiet G & K dwarfs exhibit stellar signals on the order of 1 m s^{-1}. To take full advantage of this forthcoming 10 cm s^{-1} precision for planet detection, we need tools to disentangle signals induced by orbiting planets from the signals intrinsic to the stars – particularly those caused by stellar activity. Photometric observations taken simultaneously with high-resolution spectroscopic observations are helpful because they provide an independent assessment of the time-varying activity level of each target. Here we propose 2 late G and K stars in the Kepler 2 Campaign 3 field of view to be added to the K2 Camp 3 long cadence target list. We have been awarded 238 hours of time on CHIRON (a high-resolution spectrometer on the 1.5 m telescope at CTIO) to observe these targets, which we will use to observe these two targets nightly throughout the duration of Campaign 3. These nightly spectroscopic observations will be taken with the iodine cell in the optical path (for precise radial velocity measurements) in addition to nightly spectroscopic observations taken without the iodine cell in the optical path. These latter iodine-free observations will allow us to explore stellar activity indicators (such as line depth ratios and line bisectors) across the full visible spectrum without complications from the dense forest of imprinted molecular iodine lines between 5000 - 6250 Å. If added to the K2 Camp 3 target list, long cadence K2 photometry of these two targets will provide an independent indicator of stellar activity which will be combined with the spectral activity indicators and radial velocity measurements in our analysis.

Target List*:* We propose to add 2 late G & K stars from the *Hipparcos* catalog to the K2 Camp 3 long cadence target list. Cuts were placed on our sample to include only stars that have V < 7 (to ensure a high SNR for the spectroscopic observations taken with CHIRON on the 1.5 m telescope), B-V > 0.68 (G5) and B-V < 1.4 (M0). Our sample was further constrained to include only stars with M_V > 2.5 to exclude most evolved stars within our color cut. The resulting list,

attached and sorted in order of target priority, was further vetted to remove targets that will not fall on active silicon based on output from the K2fov python module. Our final proposed targets (red) are superimposed in the included HR diagram amongst all stars in the *Hipparcos* catalog within 50 pc of the Sun (blue).