THEY MIGHT BE GIANTS: the luminosity class of late-type *Kepler* targets. A. Mann[1], E. Gaidos[2], and S. Lépine[3], [1]Institute for Astronomy (amann@ifa.hawaii.edu) and [2]Dept. of Geology & Geophysics, University of Hawaii at Manoa, Honolulu, HI 96822 (gaidos@hawaii.edu), [3]Dept. of Astrophysics, American Museum of Natural History, New York, NY 10024 (lepine@amnh.org).

We determine the properties of *Kepler* target stars with K_p-J>2 (late K and M spectral type) to better determine the frequency and properties of their planets. Planets around cool stars (late K to and M spectral type) are critical tests of planet formation models [1,2], and *Kepler* results have been used to determine the frequency of short-period planets around stars as late as M0 [3], and to extend the well-established correlation between stellar metallicity/mass and giant planet frequency [4,5] to small-radius planets around late-type stars [6].

Studies such as these depend heavily on the properties of the target stars of the *Kepler* sample. There is significant evidence that late-type *Kepler* targets include a large number of interloping giant stars [7]. Inclusion or improper removal of these giant stars from the sample will result in an inaccurate planet frequency and planet-metallicity correlation [6].

We determine the fraction of late-type giant stars in the *Kepler* field using moderate resolution optical spectra for a sample of *Kepler* target stars with K_p-J > 2.0 (~K5 spectral type or later). We use CaH, TiO, K I, CaT and NaI as indicators of gravity and spectral type (Fig. 1). For bright (K_p < 14) targets, we find that giant stars make up 98.8 ± 0.6% of late-type *Kepler* targets, while for dimmer (K_p > 14) targets, giants constitute only 5 ± 1% of targets. The fraction of giant stars does not significantly decrease for these subsamples when we only consider stars with log(g) > 4 as determined by the *Kepler* Input Catalog [8-9].

We use a corrected giant star fraction to calculate the frequency of planets around late-type as well as the metallicity difference between *Kepler* exoplanet hosts and non-hosts [6] (Figure 2). We show that the results are significantly different than when we rely solely on KIC log(g) values to remove giant stars (Fig. 2).

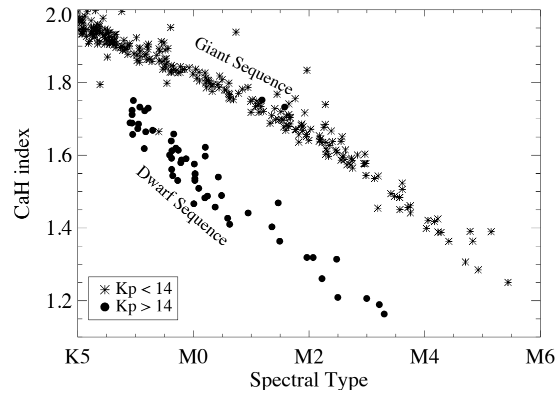

Figure 1. CaH index as defined by [10] shows a clear separation of giants and dwarfs with spectral type for robust giant/dwarf discrimination.

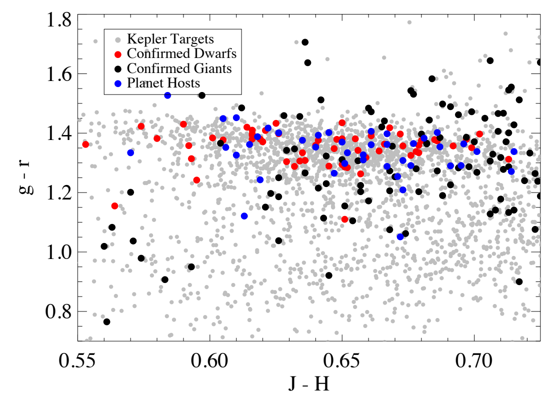

Figure 2. *Kepler* planet hosting stars show a large color offset from the general population of field stars, suggesting planet hosts are significantly more metal rich. When comparing planet hosts to just confirmed dwarfs, the two g-r distributions are not significantly different based on K-S and Welch *t* tests (70% of having consistent g-r color means/distributions).

References: [1] Laughlin G. et al. (2004) *ApJL* 612 L73. [2] Kennedy G. M. and Kenyon S. J. (2008) *ApJ* 673 502. [3] Howard et al. (2011) arXiv1103.2541. [4] Fischer D. A. and Valenti J. (2005) *ApJ* 622 1102. [5] Johnson J. A. et al. (2010) *PASP* 122 905. [6] Schlaufman K. C. and Laughlin G. (2011) *ApJ* 738 177. [7] Gaidos E. et al (2011) arXiv1108.5686G. [8] Brown T. M. et al. (2011) *AJ* 142, 112. [9] Batalha N. M. (2010) *ApJL* 713 L109. [10] Lepine et al (2007) *AJ* 669 1235.