274.03 — Measuring Heavy Metal Abundances of Red Giant Stars That Host Planets

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The elemental abundances of red giant stars are exciting potential tools for understanding the pollution of stellar hosts by planet formation processes, as well as the bulk composition of exoplanets tidally engulfed by their host stars. Utilizing ground based, high S/N echelle observations, we have worked towards measuring the relative abundances of 27 elements in a sample of red giant stars (∼160) that both do and do not host planetary companions, to identify differences in their abundances patterns and potentially constrain the physics of planet engulfment. To meet the task of fitting ∼250 lines for each of the red giants in our sample, we have developed a Python-based semi-automated equivalent width fitting routine using the PySpecKit Python package. This fitting routine was iteratively tested and calibrated against a subset of lines with equivalent width measurements made by hand. Additionally, we have tested the resulting measurements of log g against astroseismic log g's calculated from TESS light curve data, to explore potential systematic offsets in our approach.

274.04 — Measurement of Stellar Rotation Periods Using Automated Autocorrelation Analysis on TESS Light Curves, Sectors 1-13

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I use autocorrelation analysis to create a robust and automated algorithm to measure stellar rotation periods of stars observed by the Transiting Exoplanet Survey Satellite (TESS). I use 2-minute cadence light curves from TESS Sectors 1-13 to search for rotation periods of less than 13 days among approximately 150,000 main-sequence stars of type G. I am able to positively identify rotation periods for over 10% of these stars, and these periods are consistent between sectors when the target is observed multiple times. For known fast-rotators, my algorithm recovers rotation periods in agreement with the literature, thus demonstrating the potential of this method for extracting stellar parameters from large datasets with minimal supervision. The resulting sample of rotation periods provide a dataset which can be used to search for regions of recent star formation and undiscovered moving groups, and as a basis for future gyrochronology studies.

274.05 — Brown Dwarf Variability in the Optical: Results from K2 and TESS

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Here, we report the variability of two very low mass objects, spectral types M9V and L5V, whose previously reported periods we were able to independently confirm. These objects, as well as the other's in our survey, are low-mass, cool, and faint. Observing them in the optical requires pushing K2 to the edge of its potential. TESS provides a unique opportunity to expand our sample size of optical observations of low-mass, cool, faint objects, allowing more opportunities to observe variability.

274.06 — Five Decades of Chromospheric Activity in 185 Sunlike Stars

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Stellar activity is a quintessential piece of our understanding of stars and a major source of false signals in the hunt for exoplanets. We have combined records of chromospheric activity from several data sets to produce extended time series of stellar activity in main sequence and subgiant stars. We combined data from Mount Wilson Observatory HK survey starting in 1966 and the California-Carnegie Planet Search spanning 2001 to approximately 2016 to produce ∼50 years of S-value (quantification of stellar activity) measurements for 185 stars. This study expands on previous work by Baliunas et al. (1995), who examined and classified the Mount Wilson records, which examined trends in stellar magnetic behavior with stellar properties, and found that some stars cycle similarly to the 11-year cycle of the sun. Equipped with a longer record of the S-value measurements, a stronger sense of the classification of stellar activity in these stars is possible. We classified stars as cycling, flat, long, variable, or indeterminate, and analyzed the activity cycle length of each cycling star with a periodogram. Our final paper will present a catalog of stellar activity time series along with a full table of the stars in the sample, along with many of their stellar parameters, and will further explore how stellar cycling behavior changes as a function of stellar properties.