THE ULTRAVIOLET PROPERTIES OF THE HYPATIA AND EXOCAT CATALOGS: A GUIDING CHARACTERISTIC OF HABITABILITY. E. Osby[1], E. S. Shkolnik[1], N. Hinkel[2], and the ASU NExSS Team[1].
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Introduction: The Nexus for Exoplanet System Science (NExSS) is a NASA based research collaboration network for the study planetary habitability. NExSS enlists investigators from backgrounds in various scientific disciplines to learn how these fields interact to form the conditions for life. As such, the research presented here was designed to provide NExSS with necessary information on the near-ultraviolet and far-ultraviolet emission of the F, G and K stars that make up the intersection between the Hypatia Catalog [1] and the Nearby Stellar Systems Catalog for Exoplanet Imaging Missions, or ExoCat [2]. The stars in this catalog all lie within 30 pc and their properties will be used to guide the future search for habitable planets.

A planet's habitability depends strongly on the star's UV emission, which chemically modifies, ionizes, and may even erodes the atmosphere over time through ionization and subsequent stripping by the stellar wind particle. We present the UV characteristics of the combined catalog, determine trends with activity levels and effective temperature, and identify activity outliers which may signal low probabilities of habitability around these stars.

Method: All 2351 F, G, K stars provided by the two catalogs were cross-correlated with the archived UV photometry of the Galaxy Evolution Explorer (GALEX) space mission. The GALEX satellite imaged approximately 2/3 of the sky from 2003 to 2013 with the two UV bands: the near-UV (NUV, 1750-2750 Å) and far-UV (FUV, 1350-1750 Å). The full description of the instrument and its mission is provided [3] of the pipeline [4].

Of the 2351 stars in the catalog, 1624 (69%), were observed by GALEX, with 1365 detected in both the NUV and FUV bands. The NUV detector response becomes non-linear beyond 34 counts per second. This was the case for 743 (31%) of the detected targets. In these cases the NUV measurements we report represent a lower limit on the NUV flux density. In the FUV, the detector's response becomes non-linear beyond 108 counts per second and affected 17 (0.7%) of the observed stars. GALEX did not detect 380 (16%) of the stars in the FUV for which we report estimated upper limits.

Further Work: The ASU NExSS team will use the wide array of information provided by this catalog to continue to identify the stars with the highest potential to host habitable planets. The NUV and FUV data provided by this catalog will help to determine which stars are stable enough to host planets capable of supporting life and guide future missions in their choice of target systems.

References:

[1] Hinkel et al. (2014) *The Astrophysical Journal, 148, 33* [2] Turnbull (2015) *arXiv:1510.01731*. [3] Morrissey et al. (2005) *The Astrophysical Journal, 619, L7-L10*. [4] Morrissey et al. (2007) *Astrophysical Journal Supplement Series, 173, 682-697*.