Catalog of Ultraviolet Bright Stars (CUBS): Strategies for UV occultation measurements, planetary illumination modeling, and sky map analyses using hybrid IUE-Kurucz spectra. M. A. Velez[1,2], K. D. Retherford[2,1], V. Hue[3], J. A. Kammer[2], T. M. Becker[2,1], G. R. Gladstone[2,1], M. W. Davis[2], T. K. Greathouse[2], P. M. Molyneux[2], S. M. Brooks[4], U. Raut[2,1], M. H. Versteeg[2]; [1]Department of Physics and Astronomy, University of Texas at San Antonio, 1 UTSA Circle, San Antonio, TX, USA 78249 (michael.velez@contractor.swri.org), [2]Southwest Research Institute, 6220 Culebra Road, San Antonio, TX, USA 78238, [3]Laboratoire d'Astrophysique de Marseille, 38 Rue Frédéric Joliot Curie, 13013 Marseille, France, [4]Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, CA, USA 91109

Introduction: Ultraviolet spectroscopy is a powerful method to study planetary surface composition through reflectance measurements and atmospheric composition through stellar/solar occultations, transits of other planetary bodies, and direct imaging of airglow and auroral emissions. The next generation of ultraviolet spectrographs (UVS) on board ESA's JUICE (Jupiter Icy Moons Explorer) and NASA's Europa Clipper missions will perform such measurements of Jupiter and its moons in the early 2030's. This work presents a compilation of a detailed UV stellar catalog, named CUBS, of targets with high intensity in the 52-206 nm wavelength range with applications relevant to planetary spectroscopy. These applications include: 1) Planning and simulating occultations, including calibration measurements; 2) Modeling starlight illumination of dark, nightside planetary surfaces primarily lit by the sky; and 3) Studying the origin of diffuse galactic UV light as mapped by existing datasets from Juno-UVS [1,2] and others. CUBS includes information drawn from resources such as the International Ultraviolet Explorer (IUE) [3] catalog and SIMBAD [4]. We have constructed model spectra at 0.1 nm resolution for almost 90,000 targets using Kurucz models [5] and, when available, IUE spectra. CUBS also includes robust checks for agreement between the Kurucz models and the IUE data. We also present a tool for which our catalog can be used to identify the best candidates for stellar occultation observations, with applications for any UV instrument. We report on our methods for producing CUBS and discuss plans for its implementation during ongoing and upcoming planetary missions.

Summary: A robust UV stellar catalog can serve as an invaluable resource to those performing UV spectroscopic studies that utilize UV-bright stars. CUBS was created using a combination of Kurucz models and IUE spectra, where available. For those stars with available IUE spectra, we compared the Kurucz and the IUE spectra to assess the efficacy of the Kurucz models. We also compared these spectra to those available from Juno-UVS calibration to further provide a confidence test for the Kurucz models. We found that there is a strong agreement between them, which demonstrates that the models are sufficiently reliable for the purposes of observation planning. This presentation also discusses three possible applications of CUBS:

1. Planning and simulating stellar occultations
2. Modeling illumination of dark, nightside planetary surfaces primarily lit by the background sky
3. Investigating the origin of diffuse galactic UV light as hinted by previous UV datasets

Stellar occultations are a key tool for studying atmospheric compositions and structure throughout the solar system. Starlight illumination modeling is important for analyzing surface composition in otherwise dark regions on planetary surfaces. Future UV sky map investigations are needed to understand the full extent of the diffuse components that contribute to the galaxy's glow. Several planned uses will be described for supporting the upcoming Europa Clipper and JUICE mission UV investigations.

References: [1] Hue V. et al. (2019), *The Astro. J. 157, 90*. [2] Hue V. et al. (2021), *JATIS 7, 4*. [3] Boggess A. et al. (1978), *Nature 275, 372–377*. [4] Wenger M. et al. (2000), *Astron. Astrophys. Suppl. Ser. 143, 9–22*. [5] Castelli F. and Kurucz R. L. (2003), in *Modelling of Stellar Atmos. 210, A20*.