**LRO LAMP FAR-ULTRAVIOLET OBSERVATIONS OF ARISTARCHUS CRATER.** E. A. Czajka[1,2], K. D. Retherford[2,1], G. Kramer[3], A. Hendrix[3], J.T.S. Cahill[4], B.D. Byron[5], T.K. Greathouse[2], L.O. Magaña[4], K.E. Mandt[4], C. Grava[2]. [1]Department of Physics and Astronomy, University of Texas at San Antonio, One UTSA Circle, San Antonio, TX 78249, [2]Southwest Research Institute, 6220 Culebra Rd., San Antonio, TX 78238, [3]Planetary Science Institute, 1700 East Fort Lowell, Suite 106, Tucson, AR 85719, [4]Johns Hopkins University Applied Physics Laboratory, 11100 Johns Hopkins Rd., Laurel, MD 20723, [5]Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Dr, Pasadena, CA 91109.

**Introduction:** Aristarchus crater remains a high priority target for future remote and crewed lunar missions [1]. Mineral deposits of anorthite (central peak), olivine (Southwest of crater rim), and impact melt glass (Northeast of crater rim) at Aristarchus have been identified by analysis from Clementine, Chandrayaan-1's Moon Mineral Mapper ($M^3$), and Lunar reconnaissance Orbiter's (LRO) Diviner Lunar Radiometer Experiment [2,3,4,5]. These relatively immature mineral deposits make Aristarchus a good case study for analyzing compositional signatures of feldspars, mafic minerals and impact melts in multi-wavelength albedo observations.

Laboratory reflectance studies of Apollo soil samples, terrestrial analogs, and silicates indicate far-UV spectra are sensitive to higher energy orbital transitions within minerals [6,7,8]. More recent observations from LRO's Lyman Alpha Mapping Project (LAMP) confirm that LAMP Off/On band ratio and Off band spectral slope maps are sensitive to feldspathic compositions and bright crater rays [9, 10]. We use observations from the LRO-LAMP far-UV instrument, far-UV laboratory spectra of Apollo samples, and near-IR observations from $M^3$, to analyze the composition of the Aristarchus high albedo ejecta blanket and surrounding areas.

**Far Ultraviolet Observations and Spectra:** Our analysis is focused on four deposits around Aristarchus crater. We use three well studied deposits (anorthite, olivine, and pyroxene rich impact melt), and the high albedo ejecta blanket around Aristarchus [3,4,5,11]. Additionally we identify laboratory analogs for common endmembers and available Apollo soils that have published far-UV spectra [6,7,8]. We then compare the analog Off/On band ratios to the LAMP observed Off (155.57-189.57 nm)/On (129.57-155.57 nm) band ratios at each of region of interest around Aristarchus. Additionally we compare LAMP far-UV and infrared spectra to identify and map the distribution of plagioclase endmembers in Aristarchus' ejecta blanket.

Using LAMP Off/On band ratio maps, and the $M^3$ maps as a reference, average Off/On band ratio values were calculated for each region of interest. We then compare these average Off/On band ratio values to laboratory Off/On band values of specific compositions. LAMP far-UV and $M^3$ near-IR spectra are compared qualitatively.

**Conclusions:** We find that LAMP Off/On band ratios are able to distinguish between plagioclase feldspars and minerals such as quartz and mafic dominated compositions. LAMP spectra for each region of interest are relatively identical shortward of ~170 nm. Longward of 170 nm, the LAMP spectra diverge into two distinct groups with either 1) low (0.6-0.7) or 2) high (1-1.2) normalized hemispherical albedo. As a general trend, Off/On band values increase with plagioclase content. Far-UV electronic transitions associated with alkali-silicate bonds could explain the increase in far-UV albedo longward of 170 nm observed both by the LAMP instrument and previous laboratory studies [12]. The LAMP Off/On band ratios at Aristarchus are higher than previously reported ratios for plagioclase rich regions, suggesting the composition is unique to Aristarchus. Spectra from LAMP and $M^3$ both show the central peak and high albedo ejecta around Aristarchus contains shocked, possibly alkalic, plagioclase feldspar.

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**References:**

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