Title: Changes to Solar Diameter & Calculating Limb Darkening at Ultra Violet Wavelengths

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Abstract:

Solar eclipses seen from spacecraft are relatively common, and they provide an opportunity to measure the solar diameter as well as the center-to-limb variation of solar spectral irradiance at several wavelengths. The SOLar-Stellar Irradiance Comparison Experiment (SOLSTICE) on the Solar Radiation and Climate Experiment (SORCE) has been making stellar irradiance measurements from 2003 to the present. We have analyzed 22 events using the Solar Position Sensor which records visible wavelengths at a 1-second cadence. Our measurements cover an entire solar cycle, and we can put an upper limit on the variation of the solar diameter with solar activity. We have also analyzed a solar eclipse event from the Extreme ultraviolet and X-ray Sensor (EXIS) on the Geostationary Operational Environmental Satellite 16 (GOES-16). The EXIS dataset includes 1-second cadence measurements at Lyman-alpha (121.6 nm), which allow for a relatively uncommon measurement of the center-to-limb variation at that wavelength.