

Polarimetric calibration of the Sunrise UV Spectropolarimeter and Imager

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Abstract:

Sunrise is a 1-m optical solar observatory mounted in a balloon that can reach ~37 km above the ground. Its main propose is to avoid most of the atmospheric seeing and absorption, to study magnetic fields and plasma flows in the solar atmosphere with very high spatial resolution and sensitivity. After two successful flights in 2009 and 2013, a third campaign is planned for 2022. The Sunrise III post-focus instrumentation will be completely renewed to include three full-Stokes spectropolarimeters that will simultaneously cover wavelengths from ~314-860 nm, to probe different heights of the solar photosphere and chromosphere. The Sunrise UV Spectropolarimeter and Imager (SUSI), is a single-slit grating spectrograph that operates in the 313-430 nm range, covering thousands of spectral lines that are not accessible from the ground and thus largely unexplored. SUSI includes a dual-beam polarimeter based on a rotating wave-plate and a synchronous phase-diversity, wide-band channel used for context and image restoration. Given that SUSI does not include a polarimetric calibration unit on board, it has to be calibrated on ground previous to its flight. Furthermore, the quality of this calibration is crucial to avoid artifacts and allow SUSI to reach its magnetic sensitivity goal, in particular at short wavelengths with very low expected flux. In this poster we report about the development status of SUSI and the preliminary results of its pre-flight polarimetric calibration.

Session: Solar Physics, heliosphere, cosmic rays

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