

SUNRISE III/SCIP observations of three-dimensional magnetic fields in the solar atmosphere

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Precise polarization measurements of numerous spectral lines across a broad wavelength range are essential for exploring the three-dimensional structures of the magnetic field in the solar atmosphere. They provide fundamental insights into the heating mechanisms and dynamic phenomena in the solar atmosphere. The third flight of the SUNRISE balloon-borne stratospheric solar observatory successfully completed 6.5 days of observations in July 2024. One of the focal-plane instruments onboard SUNRISE is the Sunrise Chromospheric Infrared Spectro-Polarimeter (SCIP) that is a slit-scanning spectropolarimeter to measure the polarization state of multiple spectral lines in the 850 nm and 770 nm wavelength bands, including chromospheric and photospheric lines, with the spatial resolution of 0.2". SCIP has obtained unprecedented spectropolarimetric data for various solar targets, including the quiet Sun regions, emerging flux regions, dark filaments, flares, and off-limb regions. In these targets, we find the interesting Stokes profiles associated with fine-scale three-dimensional structures in the photosphere and chromosphere. In this presentation, we will summarize the initial findings from SUNRISE III/SCIP.