The Solar Imaging Metasurface Polarimeter (SIMPol)

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The Solar Imaging Metasurface Polarimeter (SIMPol) is a division-of-amplitude (i.e,. spatially modulated), full-Stokes telescope for imaging the full solar disk in a 0.1A range about the Sr-I line at 460.7 nm (for Hanle effect diagnostics of quiet-Sun magnetism [1,2]). SIMPol can be used as a standalone telescope or pupil-matched to a larger observatory telescope. SIMPol is a conventional refractive telescope except for the inclusion of a new technology known as a metasurface polarization splitter (MPS), a specialized nanofabricated grating whose diffraction orders are polarization-sensitive for a custom set of polarization states [3]. The MPS enables division-of-amplitude with a simple optical architecture by capturing the full Stokes vector over the full solar disk with each sensor frame. Fabrication and characterization of the MPS component and the calibration and validation of SIMPol with the MPS integrated are shown. In addition, space qualification test results are presented assessing the MPS technology's environmental readiness for future imaging polarimeters.

References

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