

# Research on the radiometric calibration of the Spaceborne Directional Polarimetric Camera

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The Spaceborne Directional Polarimetric Camera (SDPC) is dedicated to quantitatively measure microphysical properties of aerosol particles. It has 110° field of view, 512 × 512 pixels detector array, 5 unpolarized observation channels, 3 polarized observation channels and spectral detection range from visible to near infrared. In this paper, two radiometric calibration models have been constructed for unpolarized observation channels and polarized observation channels respectively. Due to the ultra-wide-angle telecentric imaging lenses of the SDPC, polarization occurs when incident light is obliquely incident on these multiple lenses. Combined integrating sphere and rotated polarizer as reference source, the polarization sensitivity of lenses has been measured by the Fourier series analysis method in the full field of view. Using the high-precision two-dimensional rotating platform and the large-bore integrating sphere as radiation source, the non-uniformity of the pixel response has been corrected by the sectional viewing field measurement method, and after correction the relative radiometric calibration accuracy is better than 0.5%. The radiance traceability chain based on the standard lamp diffuse reflection plate is designed. Transfer uncertainty, non-linearity and non-stability of all observation channels have been evaluated. The result shows that the calibration uncertainty of absolute radiation responsivity of each spectral band is less than 5%.

## References

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