



Fundamentals of Polarimetric Remote Sensing (SPIE Tutorial Text Vol. TT81)

John R. Schott

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Fundamentals of Polarimetric Remote Sensing (SPIE Tutorial Text Vol. TT81) John R. Schott Polarimetric remote sensing offers the potential to provide a new dimension for observations of the Earth. This book takes a systems approach to the physical processes involved with formation, collection, and analysis of polarimetric remote sensing data in the visible through longwave infrared. The emphasis is on Earth observation at human scales (ground sample distances of fractions of a meter to tens of meters) where the contrast between manmade objects and natural backgrounds are typical subjects of interest.

This text is targeted at individuals with a sound quantitative understanding of remote sensing who need an introduction to polarimetric signals as they relate to remote sensing. It includes a brief review of the polarized nature of electromagnetic energy and radiometry and introduces ways to characterize a beam of polarized energy (Stokes vectors) and polarized energy matter interactions (Mueller matrices). The polarized bidirectional reflectance distribution function (pBRDF) is introduced as a way to characterize the reflective and emissive polarimetric behavior of materials. The goal is to provide the reader with an introduction to the topic, an appreciation of the issues, and the tools to begin to work in this field.

Contents:

- Review of Radiometry
- Wave Nature of EM Energy and Introduction of the Polarization Ellipse
- Ways to Represent the Polarimetric State of a Beam
- Polarimetric Interactions: Reflection and Transmission
- Polarimetric Bidirectional Reflectance Distribution Functions (BRDF)
- Polarized Form of the Governing Equation Including Atmospheric Scattering Terms
- Sensors for Measuring the Polarized State of a Beam
- Processing and Display Algorithms
- Measurements and Modeling of the pBRDF of Materials
- Longwave Infrared pBRDF Principles
- LWIR pBRDF Measurements and Modeling



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