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Nota di contenuto	1. Introduction to Radiometry -- Definitions -- Why Measure Light? -- Historical Background -- Radiometric Measurement Process -- Radiometry Applications. 2. Propagation of Optical Radiation -- Basic Definitions -- Fundamental Radiometric Quantities -- Radiometric Approximations -- Equation of Radiative Transfer -- Configuration Factors -- Effect of Lenses on Power Transfer -- Common Radiative Transfer Configurations -- Integrating Sphere -- Radiometric Calculation Examples -- Generalized Expressions for Image-Plane Irradiance -- Summary of Some Key Concepts. 3. Radiometric Properties of Materials -- Introduction and Terminology -- Transmission -- Reflection -- Absorption -- Relationship Between Reflectance, Transmittance, and Absorptance -- Directional Characteristics -- Emission -- Spectral Characteristics -- Optical Materials Checklist. 4. Generation of Optical Radiation -- Introduction -- Radiation Laws -- Emitter Types and Properties -- Practical Sources of Radiant Energy -- Radiation Source Selection Criteria -- Source Safety Considerations -- Summary of Some Key Concepts. 5. Detectors of Optical Radiation -- Introduction -- Definitions -- Figures of Merit -- #N 6. Radiometric Instrumentation -- Introduction -- Instrumentation Requirements -- Radiometer Optics -- Spectral Instruments. 7. Radiometric Measurement and Calibration -- Introduction --

Measurement Types -- Errors in Measurements, Effects of Noise, and Signal-to-Noise Ratio in Measurements -- Measurement and Range Equations -- Introduction to the Philosophy of Calibration -- Radiometric Calibration Configurations -- Example Calculations: Satellite Electro-optical System -- Final Thoughts.
Table of Appendices -- Systeme Internationale (SI) Units for Radiometry and Photometry -- Physical Constants, Conversion Factors, and Other Useful Quantities -- Antiquarian's Garden of Sane and Outrageous Terminology -- Solid-Angle Relationships -- Glossary -- Effective Noise Bandwidth of Analog RC Filters and the Selection of Filter Parameters to Optimize Signal-to-Noise Ratio -- Bandwidth Normalization by Moments -- Jones Near-Small-Source Calibration Configuration -- Is Sunglint Observable in the Thermal Infrared? -- Documentary Standards for Radiometry and Photometry -- Radiometry and Photometry Bibliography -- Reference List for Noise and Postdetection Signal.

Sommario/riassunto

The material from this book was derived from a popular first-year graduate class taught by James M. Palmer for over twenty years at the University of Arizona College of Optical Sciences. This text covers topics in radiation propagation, radiometric sources, optical materials, detectors of optical radiation, radiometric measurements, and calibration. Radiometry forms the practical basis of many current applications in aerospace engineering, infrared systems engineering, remote sensing systems, displays, visible and ultraviolet sensors, infrared detectors of optical radiation, and many other areas. While several texts individually cover topics in specific areas, this text brings the underlying principles together in a manner suitable for both classroom teaching and a reference volume that the practicing engineer can use.