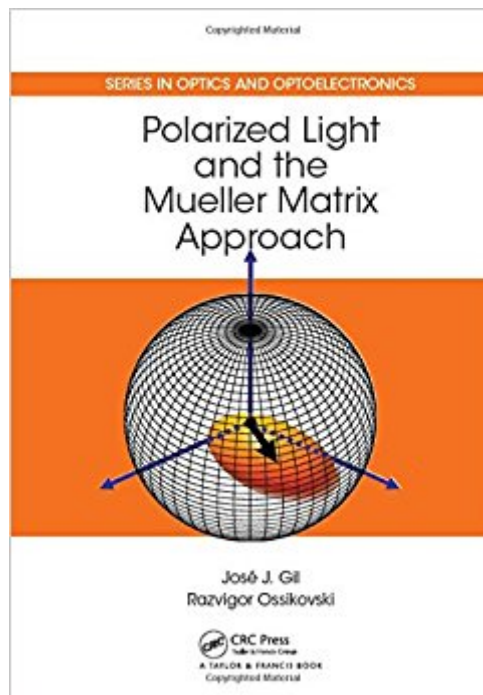




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# Polarized Light And The Mueller Matrix Approach (Series In Optics And Optoelectronics)



## Synopsis

An Up-to-Date Compendium on the Physics and Mathematics of Polarization Phenomena Polarized Light and the Mueller Matrix Approach thoroughly and cohesively integrates basic concepts of polarization phenomena from the dual viewpoints of the states of polarization of electromagnetic waves and the transformations of these states by the action of material media. Through selected examples, it also illustrates actual and potential applications in materials science, biology, and optics technology. The book begins with the basic concepts related to two- and three-dimensional polarization states. It next describes the nondepolarizing linear transformations of the states of polarization through the Jones and Muellerâ “Jones approaches. The authors then discuss the forms and properties of the Jones and Mueller matrices associated with different types of nondepolarizing media, address the foundations of the Mueller matrix, and delve more deeply into the analysis of the physical parameters associated with Mueller matrices. The authors proceed to interpret arbitrary decomposition and other interesting parallel decompositions as well as compare the powerful serial decompositions of depolarizing Mueller matrix  $M$ . They also analyze the general formalism and specific algebraic quantities and notions related to the concept of differential Mueller matrix. The book concludes with useful approaches that provide a geometric point of view on the polarization effects exhibited by different types of media. Suitable for novices and more seasoned professionals, this book covers the main aspects of polarized radiation and polarization effects of material media. It expertly combines physical and mathematical concepts with important approaches for representing media through equivalent systems composed of simple components.

## Book Information

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"The best-ever treatise on the main concepts of both polarization states of light and Mueller matrices of media, illustrated with numerous figures, tables, and experimental examples. The comprehensiveness, clarity, and rigor make it essential for anyone interested in this field." •Tiberiu Tudor, Professor, Faculty of Physics, University of Bucharest "Gil and Ossikovski have gathered together in one source a wealth of information on the intricacies of the interpretation of representations of polarized light. Current research on the mathematics of polarized light is thoughtfully presented. This is an essential reference for the serious student or researcher in the field." •Dr. Dennis Goldstein, Polaris Sensor Technologies, Inc.

José Jorge Gil is a professor at the University of Zaragoza, where he leads R&D projects in physics and e-learning technologies and methodologies. He has developed an original dual-rotating-retarder absolute Mueller polarimeter, introduced new concepts such as the depolarization index, and developed wireless systems for interactive meetings, which earned the Tecnova award from the Spanish Industry Ministry. Dr. Gil has also been a recipient of the G.G. Stokes Award from the International Society for Optics and Photonics (SPIE) in recognition of his "groundbreaking collection of rigorous mathematical descriptions of polarization that are used widely to interpret experimental data." He received his PhD in physics from the University of Zaragoza. Razvigor Ossikovski is an associate professor at the Ecole Polytechnique, where he is the leader of the fundamental polarimetry and Raman spectroscopy activities in the Laboratory of Physics of Interfaces and Thin Films. His current research interests are the theory of polarimetry (Mueller matrix algebra) and experimental tip-enhanced Raman spectroscopy. He received his PhD in physics (materials science) from the Ecole Polytechnique.

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