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Enhancement -- 17. Optical Coherence Tomography: Advanced Modeling -- 18. Flying Spot En-Face OCT Imaging -- 19. Polarization Sensitive Optical Coherence Tomography -- 20. Doppler Optical Coherence tomography -- 21. Analysis of Doppler Optical Coherence Tomography Signals in Low and High Scattering Media -- 22. Optical Coherence Tomography. Principles and Applications of Microvascular Imaging -- 23. Next Step in Ocular Imaging Combining Ultrahigh Resolution and High Speed OCT -- 24. Fundamentals of OCT and Clinical Applications of Endoscopic OCT -- 25. Needle Probes in Optical Coherence Tomography -- 26. Assessment of Cardiovascular Disease through Permeability Rate: Quantified Using Optical Coherence Tomography -- PART V: MICROSCOPY -- 27. Optical Coherence Microscopy -- 28. Confocal scanning laser microscopy using scattering as the contrast mechanism -- PART VI: APPLICATIONS -- 29. Mueller Matrix Polarimetry in Material Science, Biomedical and Environmental Applications -- 30. Nonlinear Laser Fluorescence Spectroscopy of Natural Organic Compounds -- 31. Triplet-Triplet Annihilation Assisted Upconversion: All-optical Tools for Probing Physical Parameter of Soft Matter -- Index.

Sommario/riassunto

This Handbook provides comprehensive coverage of laser and coherent-domain methods as applied to biomedicine, environmental monitoring, and materials science. Worldwide leaders in these fields describe the fundamentals of light interaction with random media and present an overview of basic research. The latest results on coherent and polarization properties of light scattered by random media, including tissues and blood, speckles formation in multiple scattering media, and other non-destructive interactions of coherent light with rough surfaces and tissues, allow the reader to understand the principles and applications of coherent diagnostic techniques. The expanded second edition has been thoroughly updated with particular emphasis on novel coherent-domain techniques and their applications in medicine and environmental science. Volume 1 describes state-of-the-art methods of coherent and polarization optical imaging, tomography and spectroscopy; diffusion wave spectroscopy; elastic, quasi-elastic and inelastic light scattering spectroscopy and imaging; digital holographic microscopy, the Fourier transform light scattering method, and coherent diffractive imaging; wavefront sensing, aberration measurement and adaptive optics for ophthalmology; and laser remote sensing. Volume 2 presents the new and growing field of coherent optics in optical coherence tomography (OCT). Various applications of OCT and confocal microscopy, including biomedical endoscopy, are discussed. A special section covers Mueller matrix polarimetry, nonlinear laser fluorescence spectroscopy, and triplet-triplet annihilation assisted upconversion as optical tools for probing the physical parameters of materials and natural organic compounds. Represents the only reference work offering integrated coverage of coherent-domain optical methods for a wide range of applications involving strong light scattering Covers the fundamentals of light interaction with random media Describes specific interactions of coherent and low-coherent light with tissues and blood Presents advanced optical coherence tomography techniques and other non-destructive diagnostic methods Extensively revised and updated from the 2004 edition.