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Disciplina	621.36
Soggetti	Spectroscopy Microscopy Lasers Photonics Optical data processing Nanoscale science Nanoscience Nanostructures Materials science Spectroscopy and Microscopy Biological Microscopy Optics, Lasers, Photonics, Optical Devices Computer Imaging, Vision, Pattern Recognition and Graphics Nanoscale Science and Technology Characterization and Evaluation of Materials
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Nota di contenuto	Part I: Fundamentals and Tutorials -- Basic Knowledge in STED Nanoscopy (A. Egner, C. Geisler, and R. Siegmund) -- Basic Knowledge in Coherent X-ray Imaging (T. Salditt, A.-L. Robisch) -- Basic Knowledge: X-ray Focusing & Optics (T. Salditt and M. Osterhoff) -- Statistical Foundations of Nanoscale Photonic Imaging (A. Munk, T. Staudt, and F. Werner) -- Inverse Problems (T. Hohage, B. Sprung, and

F. Weidling) -- Proximal Methods for Image Processing (D. R. Luke) -- Part II: Progress and Perspectives -- Quantifying the Number of Molecules in STED/RESOLFT Nanoscopy (J. Keller-Findeisen, S. Sahl, and S. W. Hell) -- Metal-Induced Energy Transfer Imaging (A. I. Chizhik, and J. Enderlein) -- Reversibly Switchable Fluorescent Proteins for RESOLFT Nanoscopy (N. A. Jensen, I. Jansen, M. Kamper, and S. Jakobs) -- A Statistical and Biophysical Toolbox to Elucidate Structure and Formation of Stress Fibers (B. Eltzner, L. Hauke, S. Huckemann, F. Fehfeldt, and C. Wollnik) -- Photonic Imaging with Statistical Guarantees: From Multiscale Testing to Multiscale Estimation (A. Munk, K. Proksch, H. Li, and F. Werner) -- Efficient, Quantitative Numerical Methods for Statistical Image Deconvolution and Denoising (D. R. Luke, C. Charitha, R. Shefi, and Y. Malitsky) -- Holographic Imaging and Tomography of Biological Cells and Tissues (T. Salditt, and M. Töpperwien) -- Constrained Reconstructions in X-ray Phase Contrast Imaging: Uniqueness, Stability and Algorithms (S. Maretzke, T. Hohage) -- Scanning Small-Angle X-ray Scattering and Coherent X-ray Imaging of Cells (T. Salditt and S. Köster) -- Single Particle Imaging with FEL using Photon Correlations (B. von Ardenne and H. Grubmüller) -- Development of Ultrafast X-ray Free Electron Laser Tools in (Bio) Chemical Research (S. Techert, S. Thekku Veedu, S. Bari) -- Polarization-sensitive Coherent Diffractive Imaging Using HHG (S. Zayko, O. Kfir, and C. Ropers) -- Nonlinear Light Generation in Localized Fields Using Gases and Tailored Solids (M. Sivilis and C. Ropers) -- Wavefront and Coherence Characteristics of Extreme UV and Soft X-ray Sources (B. Schäfer, B. Flöter, T. Mey, and K. Mann) -- Laboratory-scale Soft X-ray Source for Microscopy and Absorption Spectroscopy (M. Müller and K. Mann) -- Multilayer Zone Plates for Hard X-ray Imaging (M. Osterhoff and H.-U. Krebs) -- Convergence Analysis of Iterative Algorithms for Phase Retrieval (D. R. Luke and A.-L. Martins) -- One-Dimensional Discrete-Time Phase Retrieval (R. Beinert and G. Plonka).

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### Sommario/riassunto

This open access book, edited and authored by a team of world-leading researchers, provides a broad overview of advanced photonic methods for nanoscale visualization, as well as describing a range of fascinating in-depth studies. Introductory chapters cover the most relevant physics and basic methods that young researchers need to master in order to work effectively in the field of nanoscale photonic imaging, from physical first principles, to instrumentation, to mathematical foundations of imaging and data analysis. Subsequent chapters demonstrate how these cutting edge methods are applied to a variety of systems, including complex fluids and biomolecular systems, for visualizing their structure and dynamics, in space and on timescales extending over many orders of magnitude down to the femtosecond range. Progress in nanoscale photonic imaging in Göttingen has been the sum total of more than a decade of work by a wide range of scientists and mathematicians across disciplines, working together in a vibrant collaboration of a kind rarely matched. This volume presents the highlights of their research achievements and serves as a record of the unique and remarkable constellation of contributors, as well as looking ahead at the future prospects in this field. It will serve not only as a useful reference for experienced researchers but also as a valuable point of entry for newcomers.

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