WILEY

Foundations of Nonlinear Optical Microscopy

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ISBN: 978-1-119-81488-7

Print
March 2024
448pp

Concise yet comprehensive resource presenting the foundations of nonlinear optical microscopy

Foundations of Nonlinear Optical Microscopy brings together all relevant principles of nonlinear optical (NLO) microscopy, presenting NLO microscopy within a consistent framework to allow for the origin of the signals and the interrelation between different NLO techniques to be understood. The text provides rigorous yet practical derivations, which amount to expressions that can be directly related to measured values of resolution, sensitivity, and imaging contrast.

The book also addresses typical questions students ask, and answers them with clear explanations and examples. Readers of this book will develop a solid physical understanding of NLO microscopy, appreciate the advantages and limitations of each technique, and recognize the exciting possibilities that lie ahead.

Foundations of Nonlinear Optical Microscopy covers sample topics such as:

- Light propagation, focusing of light, pulses of light, classical description of light-matter interactions, and quantum mechanical description of light-matter interactions
- Molecular transitions, selection rules, signal radiation, and detection of light
- Multi-photon fluorescence and pump-probe microscopy
- Harmonic generation, sum-frequency generation, and coherent Raman scattering

Senior undergraduate and graduate students in chemistry, physics, and biomedical engineering, along with students of electrical engineering and instructors in both of these fields, can use the information within Foundations of Nonlinear Optical Microscopy and the included learning resources to gain a concise yet comprehensive overview of the subject.
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