Quantum Optics with Semiconductor Nanostructures

Description: An understanding of the interaction between light and matter on a quantum level is of fundamental interest and has many applications in optical technologies. The quantum nature of the interaction has recently attracted great attention for applications of semiconductor nanostructures in quantum information processing. Quantum optics with semiconductor nanostructures is a key guide to the theory, experimental realisation, and future potential of semiconductor nanostructures in the exploration of quantum optics.

Part one provides a comprehensive overview of single quantum dot systems, beginning with a look at resonance fluorescence emission. Quantum optics with single quantum dots in photonic crystal and microcavities are explored in detail, before part two goes on to review nanolasers with quantum dot emitters. Light-matter interaction in semiconductor nanostructures, including photon statistics and photoluminescence, is the focus of part three, whilst part four explores all-solid-state quantum optics, crystal nanobeam cavities and quantum-dot microcavity systems. Finally, part five investigates ultrafast phenomena, including femtosecond quantum optics and coherent optoelectronics with quantum dots.

With its distinguished editor and international team of expert contributors, Quantum optics with semiconductor nanostructures is an essential guide for all those involved with the research, development, manufacture and use of semiconductors nanodevices, lasers and optical components, as well as scientists, researchers and students.

- A key guide to the theory, experimental realisation, and future potential of semiconductor nanostructures in the exploration of quantum optics
- Chapters provide a comprehensive overview of single quantum dot systems, nanolasers with quantum dot emitters, and light-matter interaction in semiconductor nanostructures
- Explores all-solid-state quantum optics, crystal nanobeam cavities and quantum-dot microcavity systems, and investigates ultrafast phenomena

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Emission properties of photonic crystal nanolasers
Deformed wavelength-scale microdisk lasers with quantum dot emitters. Part 3 Light-matter interaction in semiconductor nanostructures: Photon statistics and entanglement in phonon-assisted quantum light emission from semiconductor quantum dots
Luminescence spectra of quantum dots in microcavities
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Coherent optoelectronics with quantum dots.

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