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Nota di contenuto	Spins in Optically Active Quantum Dots; Contents; Preface; 1 Introduction; 1.1 Spin; 1.2 Spin-1/2 Basics; 1.3 Quantum Dots; 1.3.1 Spin-Based Quantum Information Processing with Artificial Atoms; 1.3.2 Optically Active Quantum Dots; 1.3.3 "Natural" Quantum Dots; 2 Optically Active Quantum Dots: Single and Coupled Structures; 2.1 Epitaxial Quantum Dots; 2.2 "Natural" Quantum Dots Revisited; 2.2.1 Structure and Fabrication; 2.2.2 Energy Levels and Optical Transitions; 2.3 Self-Assembled Quantum Dots; 2.3.1 Strain-Driven Self-Alignment; 2.3.2 Optical Properties and QD Shell Structure 2.4 Alternative Epitaxial Quantum Dot Systems2.4.1 Electrically Gated Quantum Dots; 2.4.2 Advanced MBE Techniques; 2.4.3 Nanowire Quantum Dots; 2.5 Chemically-Synthesized Quantum Dots; 2.5.1 Colloidal Growth; 2.5.2 Energy Level Structure and Optical Properties; 3 Theory of Confined States in Quantum Dots; 3.1 Band Structure of III-V

Semiconductors; 3.1.1 Effective Mass of Crystal Electrons; 3.1.2 Spin-Orbit Interaction; 3.1.3 Band Structure Close to the Band Edges; 3.1.4 Band-Edge Bloch States; 3.1.5 Coupling of Bands and the Luttinger Hamiltonian
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3.6 Few-Carrier Spectra of Self-Assembled Quantum Dots
3.6.1 From Ensemble to Single Quantum Dot Spectra; 3.6.2 Transition Energies of Few-Particle States; 4 Integration of Quantum Dots in Electro-optical Devices; 4.1 Tuning Quantum Dots by Electric Fields; 4.1.1 Semiconductor Diodes; 4.1.2 Voltage-Controlled Number of Charges; 4.1.3 Optically Probing Coulomb Blockade; 4.1.4 Quantum Confined Stark Effect; 4.2 Optical Cavities; 5 Quantum Dots Interacting With the Electromagnetic Field; 5.1 Hamiltonian for Radiative Transitions of Quantum Dots; 5.1.1 Electromagnetic Field
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5.6 Dispersive Interaction

Sommario/riassunto

Filling a gap in the literature, this up-to-date introduction to the field provides an overview of current experimental techniques, basic theoretical concepts, and sample fabrication methods. Following an introduction, this monograph deals with optically active quantum dots and their integration into electro-optical devices, before looking at the theory of quantum confined states and quantum dots interacting with the radiation field. Final chapters cover spin-spin interaction in quantum dots as well as spin and charge states, showing how to use single spins for break-through quantum comput
