

1. Record Nr.	UNISA996466828003316
Titolo	Quantum Dots: a Doorway to Nanoscale Physics [[electronic resource] /] / edited by WD. Heiss
Pubbl/distr/stampa	Berlin, Heidelberg : , : Springer Berlin Heidelberg : , : Imprint : Springer, , 2005
ISBN	3-540-31523-3
Edizione	[1st ed. 2005.]
Descrizione fisica	1 online resource (X, 174 p.)
Collana	Lecture Notes in Physics, , 0075-8450 ; ; 667
Disciplina	530.12
Soggetti	Quantum physics Condensed matter Quantum Physics Condensed Matter Physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di contenuto	The Renormalization Group Approach – From Fermi Liquids to Quantum Dots (R. Shankar) -- Semiconductor Few-Electron Quantum Dots as Spin Qubits (J.M. Elzerman et al.) -- Low-Temperature Conduction of a Quantum Dot (M. Pustilnik and L. Glazman) -- Andreev Billiards (C.W.J. Beenakker).
Sommario/riassunto	Quantum dots, often denoted artificial atoms, are the exquisite tools by which quantum behavior can be probed on a scale appreciably larger than the atomic scale, that is on the nanometer scale. In this way, the physics of the devices is closer to classical physics than that of atomic physics but they are still sufficiently small to clearly exhibit quantum phenomena. The present volume is devoted to an introduction to some of these fascinating aspects, addressing in particular graduate students and young researchers in the field. In the first lecture by R. Shankar the general theoretical aspects of Fermi liquids are addressed, in particular the renormalization group approach. This is then aptly applied to large quantum dots. A completely different approach is encountered in the second contribution by J.M. Elzerman et al. in that it is a thorough experimental expose of what can be done or expected in the study of small quantum dots. Here the emphasis lies on the electron spin to be used as a qubit. In the third lecture series, by M. Pustilnik and Leonid I.

Glazman mechanisms of low-temperature electronic transport through a quantum dot -- weakly coupled to two conducting leads -- are reviewed. The fourth series of lectures by C.W.J. Beenakker deals with a very interesting aspect of nanophysics: a peculiar property of superconducting mirrors discovered by Andreev about forty years ago and still a challenge to experimental physicists.
