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Titolo	Advanced semiconductor heterostructures [[electronic resource]] : novel devices, potential device applications and basic properties / / editors, Mitra Dutta, Michael A. Stroscio
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Altri autori (Persone)	DuttaMitra StroscioMichael A. <1949->
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Nota di contenuto	CONTENTS; PREFACE; ELECTRON-PHONON INTERACTIONS IN INTERSUBBAND LASER HETEROSTRUCTURES; 1. Introduction; 2. Dielectric Continuum Model for Polar Excitations in Layered Heterostructures; 2.1. LO-phonon confinement in layered heterostructures; 2.2. Examples of scattering rate tailoring; 3. Multiband Description of Electron Confinement; 3.1. Analytical representation for the eigenstates; 3.2. Phenomenological boundary conditions; 3.3. Electron energy spectrum of basic heterostructures; 4. Subband Depopulation in Type-II Laser Heterostructures 4.1. Interband tunneling in InAs/GaSb ""leaky"" heterostructure4.2. Phonon enhancement of the depopulation process; 5. Conclusions; Acknowledgments; References; QUANTUM DOT INFRARED DETECTORS AND SOURCES; 1. Introduction; 2. Historical Background; 3. Self-Organized Quantum Dots for Devices; 4. Electronic Spectra and Carrier Dynamics in Self-Organized Quantum Dots; 5. Quantum Dot Infrared Detectors and Focal Plane Arrays; 6. Quantum Dot Infrared Sources; 7. Future Prospects; Acknowledgments; References; Generation of Terahertz Emission Based on Intersubband Transitions; 1. Introduction

2. Electrically pumped intersubband THz emitters2.1 THz emitters using electron-LO-phonon scattering for depopulation; 2.2. Role of interface and confined phonon modes; 2.3. Intrawell THz emitters using resonant tunneling for depopulation; 2.4 Transport issues of electrically pumped THz intersubband emitters; 3. Optically pumped intersubband THz emitters; 3.1 Intersubband pumped THz optical parametric oscillators (OPOs); 3.2 Intersubband optically pumped THz lasers; 3.3 Interband optically pumped THz emitters; Acknowledgments; References
MID-INFRARED GaSb-BASED LASERS WITH TYPE-I HETEROINTERFACES1. Introduction; 2. Progress in the Design of Type-I GaSb-based Diode Lasers; 3. High-power Room-temperature CW Diode Lasers Operating in the Wavelength Range of 2.3 - 2.6-m; 4. Conclusion; Acknowledgement; References; ADVANCES IN QUANTUM-DOT RESEARCH AND TECHNOLOGY: THE PATH TO APPLICATION IN BIOLOGY; 1. Introduction; 2. Recent Developments in the Application of Quantum Dots to Biology; 3. Recent Developments in GaAs-Based Quantum Dots; 4. Recent Developments in InAs-Based Quantum Dots
5. Recent Developments in GaSb-, GaN-, PbS-, CdTe-, InP-, and PbSe-Based Quantum Dots6. Recent Developments in CdSe-Based Quantum Dots; 7. Implementing Quantum Dot Technology in Biological Applications; Acknowledgments; References; HIGH-FIELD ELECTRON TRANSPORT CONTROLLED BY OPTICAL PHONON EMISSION IN NITRIDES; 1. Introduction; 2. The Basic Equations; 2.1. The Boltzmann equation; 2.2. New variables; 2.3. Boundary conditions; 3. Solutions of the Kinetic Equation; 3.1. General structure of solutions; 3.2. Relationships between f+, f- and F+, F-; 3.3. The zero energy stair s = 0
3.4- The first stair s = 1

Sommario/riassunto

This volume provides valuable summaries on many aspects of advanced semiconductor heterostructures and highlights the great variety of semiconductor heterostructures that has emerged since their original conception. As exemplified by the chapters in this book, recent progress on advanced semiconductor heterostructures spans a truly remarkable range of scientific fields with an associated diversity of applications. Some of these applications will undoubtedly revolutionize critically important facets of modern technology. At the heart of these advances is the ability to design and control the p

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Descrizione fisica	1 online resource (616 p.)
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Sensors and transducers -- Actuators -- Feedback and control systems -- Signal processing -- Hearing aids and implants -- Sensory substitution and visual prostheses -- Heart replacement -- Respiratory aids -- Active and passive prosthetic limbs.
Sommario/riassunto	Introduction to Biomechatronics provides fundamental knowledge of mechanical and electronic (mechatronic) components and systems and their interaction with human biology to assist or replace limbs, senses, and even organs damaged by trauma, birth defects, or disease. The first half of the book provides the engineering background to understand all the components of a biomechatronic system: the human subject, stimulus or actuation, transducers and sensors, signal conditioning elements, recording and display, and feedback elements.