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Publisher's Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any online entitlements included with the product. This comprehensive text is aimed at graduate level students and researchers, breaking down the complexities of fabrication, use, and maintenance of heterojunctions. Topics include: introduction to quantum mechanics, Potential barriers and wells, electronic energy levels in periodic potentials, tunneling through potential barriers, distribution functions and density of states, optical properties of interband and intersubband transitions, electrical properties, techniques and measurements, growth issues, devices: Detectors and emitters.

Characterization of Semiconductor Heterostructures and Nanostructures is structured so that each chapter is devoted to a specific characterization technique used in the understanding of the properties (structural, physical, chemical, electrical etc..) of semiconductor quantum wells and superlattices. An additional chapter is devoted to ab initio modeling. The book has two basic aims. The first is educational, providing the basic concepts of each of the selected techniques with an approach understandable by advanced students in Physics, Chemistry, Material Science, Engineering, Nanotechnology. The second aim is to provide a selected set of examples from the recent literature of the TOP results obtained with the specific technique in understanding the properties of semiconductor

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heterostructures and nanostructures. Each chapter has this double structure: the first part devoted to explain the basic concepts, and the second to the discussion of the most peculiar and innovative examples. The topic of quantum wells, wires and dots should be seen as a pretext of applying top level characterization techniques in understanding the structural, electronic etc properties of matter at the nanometer (and even sub-nanometer) scale. In this respect it is an essential reference in the much broader, and extremely hot, field of Nanotechnology. Comprehensive collection of the most powerful characterization techniques for semiconductors heterostructures and nanostructures Most of the chapters are authored by scientists that are world-wide among the top-ten in publication ranking of the specific field Each chapter starts with a didactic introduction on the technique The second part of each chapters deals with a selection of top examples highlighting the power of the specific technique to analyse the properties of semiconductors heterostructures and nanostructures

In the last couple of decades, high-performance electronic and optoelectronic devices based on semiconductor heterostructures have been required to obtain increasingly strict and well-defined performances, needing a detailed control, at the atomic level, of the structural composition of the buried interfaces. This goal has been achieved by an improvement of the epitaxial growth techniques and by the parallel use of increasingly sophisticated characterization techniques and of refined theoretical models based on ab initio approaches. This book deals with description of both characterization techniques and theoretical models needed to understand and predict the structural and electronic properties of semiconductor heterostructures and nanostructures. - Comprehensive collection of the most powerful characterization techniques for semiconductor heterostructures and nanostructures - Most of the chapters are authored by scientists that are among the top 10 worldwide in publication ranking of the specific

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field - Each chapter starts with a didactic introduction on the technique - The second part of each chapter deals with a selection of top examples highlighting the power of the specific technique to analyze the properties of semiconductors

This book presents the fabrication of optoelectronic nanodevices. The structures considered are nanowires, nanorods, hybrid semiconductor nanostructures, wide bandgap nanostructures for visible light emitters and graphene. The device applications of these structures are broadly explained. The book deals also with the characterization of semiconductor nanostructures. It appeals to researchers and graduate students.

This is a collection of articles on fundamental physical principles and methods, the topics ranging from matrix models, random surfaces, quantum dots and rings, to black holes, cosmology and testing of the tiny effects predicted by General Relativity. Among the authors are Sir Roger Penrose and other well-known experts and the articles are addressed to graduate students and researchers. The volume is a Festschrift to a noted physicist and mentor Sergei Matinyan. Contents: A Matrix Model Representation of the Integrable XXZ Heisenberg Chain on Random Surfaces (J Ambjørn and A Sedrakyan) Magnetization and Concurrence Properties of Diamond Chain: Two Approaches (N S Ananikian, H A Lazaryan, M A Nalbandyan, O Rozas and S M de Souza) Non-Trivial Holonomy and Calorons (P van Baal) Spontaneous Breaking of Lorentz-Invariance and Gravitons as Goldstone Particles (Z Berezhiani and O V Kancheli) On Emergent Gauge and Gravity Theories (J L Chkareuli) Geodesic



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Readership: Graduate students and researchers in physics. Keywords: Quantum Field Theories; gauge theories; General Relativity Key Features: Up-to-date articles on the modern problems of quantum field theory and General Relativity Prominent authors Unique treatment of mathematical methods and approaches

This is a collection of articles on fundamental physical principles and methods, the topics ranging from matrix models, random surfaces, quantum dots and rings, to black holes, cosmology and testing of the tiny effects predicted by General Relativity. Among the authors are Sir Roger Penrose and other well-known experts and the articles are addressed to graduate students and researchers. The volume is a Festschrift to a noted physicist and mentor Sergei Matinyan.

The book "Fingerprints in the optical and transport properties of quantum dots" provides novel and efficient methods for the calculation and investigating of the optical and transport properties of quantum dot systems. This book is divided into two sections. In section 1 includes ten chapters where novel

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optical properties are discussed. In section 2 involve eight chapters that investigate and model the most important effects of transport and electronics properties of quantum dot systems This is a collaborative book sharing and providing fundamental research such as the one conducted in Physics, Chemistry, Material Science, with a base text that could serve as a reference in research by presenting up-to-date research work on the field of quantum dot systems.

Reducing the size of a coherently grown semiconductor cluster in all three directions of space to a value below the de Broglie wavelength of a charge carrier leads to complete quantization of the energy levels, density of states, etc. Such “quantum dots” are more similar to giant atoms in a dielectric cage than to classical solids or semiconductors showing a dispersion of energy as a function of wavevector. Their electronic and optical properties depend strongly on their size and shape, i.e. on their geometry. By designing the geometry by controlling the growth of QDs, absolutely novel possibilities for material design leading to novel devices are opened. This multiauthor book written by world-wide recognized leaders of their particular fields and edited by the recipient of the Max-Born Award and Medal 2006 Professor Dieter Bimberg reports on the state of the art of the growing of quantum dots, the theory of self-organised growth, the theory of electronic and excitonic states, optical properties and transport in a variety of materials. It covers the subject from the early work beginning of the 1990s up to 2006. The topics addressed in the book are the focus of research in all leading semiconductor and optoelectronic device laboratories of the world.