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The Physics Of Low-dimensional Semiconductors: An Introduction



Synopsis

Low-dimensional systems have revolutionized semiconductor physics and had a tremendous impact on technology. Using simple physical explanations, with reference to examples from actual devices, this book introduces the general principles essential to low-dimensional semiconductors. The author presents a formalism that describes low-dimensional semiconductor systems, studying two key systems in detail: the two-dimensional electron gas, employed in field-effect transistors, and the quantum well, whose optical properties have multiple applications in lasers and other opto-electronic devices. The book will be invaluable to undergraduate and first-year graduate physics or electrical engineering students taking courses in low-dimensional systems or heterostructure device physics.

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Customer Reviews

The first book you should read if you wanna do some Low Dimensional Electron Physics and only learned Solid State Physics before. It just covers all topics in this field --- with the knowledge in this book, you could read any new paper published recently. And this book's written style is very friendly --- just a textbook! So it could be finished in 2 days if you know the basic notions in Solid State Physics and concentrate on it. So there is no match for such a good introductory book --- there's no other ones like this --- I searched a lot when I tried to enter this field, and this is a good choice:)

Readable introductions to mesoscopic physics are few and far between, many being either far too simplistic and naive or too mired in formalism. Davies gives clear and lucid discussions of such

topics as electron confinement in quantum wells, the integral quantum Hall effect, quantum point contacts, and MODFET's/HEMT's. Although by no means extensive and in depth, Davies does point out simplifications and refers the interested reader to relevant references for more details. Overall, it is a balanced introduction. This book is a useful point of entry for undergraduates to low-dimensional semiconductor physics. Reading this book is good preparation for more advanced and specialized literature including: Solid State Physics vol. 44 ed. Ehrenreich and Turnbull; Perspectives in Quantum Hall Effects, Das Sarma and Pinczuk. As with any new text, there are errata but an up to date webpage of corrections is maintained by the author.

These guys write in a way that's *helpful*, as opposed to many other writers who simply write it to have it there, but not make the subject any clearer. I learned more from this book than from my Solid State class. They also mention practical things that are actually done in industry, which is cool.

Used it during my graduate study when my thesis adviser recommended it. It is useful for students who want to get started, the name says "an introduction", so be prepared to move on :-). Good luck with Quantum Mechanics. PS: don't be too hard on yourself, give yourself some time while putting in consistent effort. If this book is not for you then find another one. Arrived in reasonable time and in good condition.

Solid state physics is a complicated and vast subject to understand. This book covers basic concepts regarding to the solid state physics side of semiconductors, without burdening the students of too much math. Straight-forward and easy to understand.

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