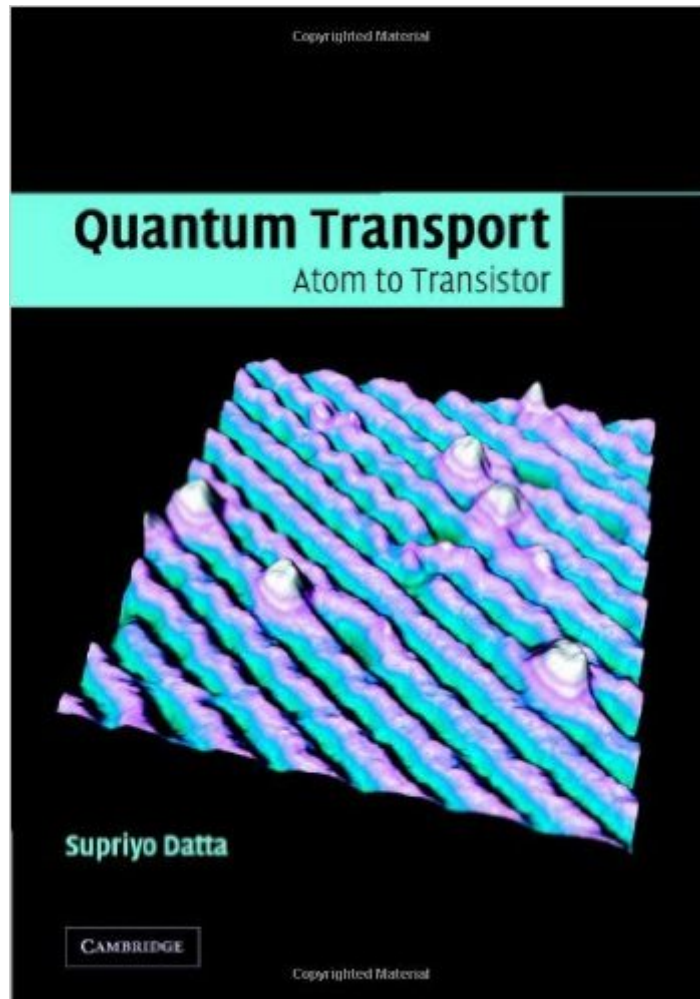


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# Quantum Transport: Atom To Transistor



## Synopsis

Including some of the most advanced concepts of non-equilibrium quantum statistical mechanics, this book presents the conceptual framework underlying the atomistic theory of matter. No prior acquaintance with quantum mechanics is assumed. Many numerical examples provide concrete illustrations, and the corresponding MATLAB codes can be downloaded from the web.

Videostreamed lectures linked to specific sections of the book are also available through web access.

## Book Information

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## Customer Reviews

The author (SD) claims that this is a physics book written for engineers. Maybe that explains why, unlike the authors of most physics books written for physicists, he doesn't seem particularly concerned with elegance, concision, abstract generality or showing how clever he is in this book. Apparently, his main concern is to help you understand stuff. Not only that, but he's chosen some very interesting stuff to tell you about. The narrative arc of the book is to show you how to get from a particle in a box to Ohm's Law, as instantiated in nanoscale transistors. The path to doing this is already laid out in the first chapter, using a "toy" level of analysis. The next nine chapters lay out building blocks for attacking the problem using Green's function (GF) techniques, which are a bit more modern and versatile than the transmission formalism favored in the past (including by SD in a previous book). The whole picture is put together in Chapters 11 and 12, followed by an appendix that shows (albeit quite tersely in comparison to the rest of the book) how the same problem is dealt

with using a second-quantization (2Q) GF formalism. The fact many pieces of this arc are repeated at successively deeper levels of analysis is very helpful. So too are SD's "big picture" introductions at the beginning of each chapter, and at the beginnings of the longer subchapters. Throughout, SD pauses to describe in words and pictures the physics behind pretty much each term of each equation -- a de-mystification that most authors of physics texts seem to avoid as if it were blasphemy. I was especially impressed when SD used these opportunities to allude to some deeper and more general issues, such as how you get from time-reversible equations to irreversible physics.

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