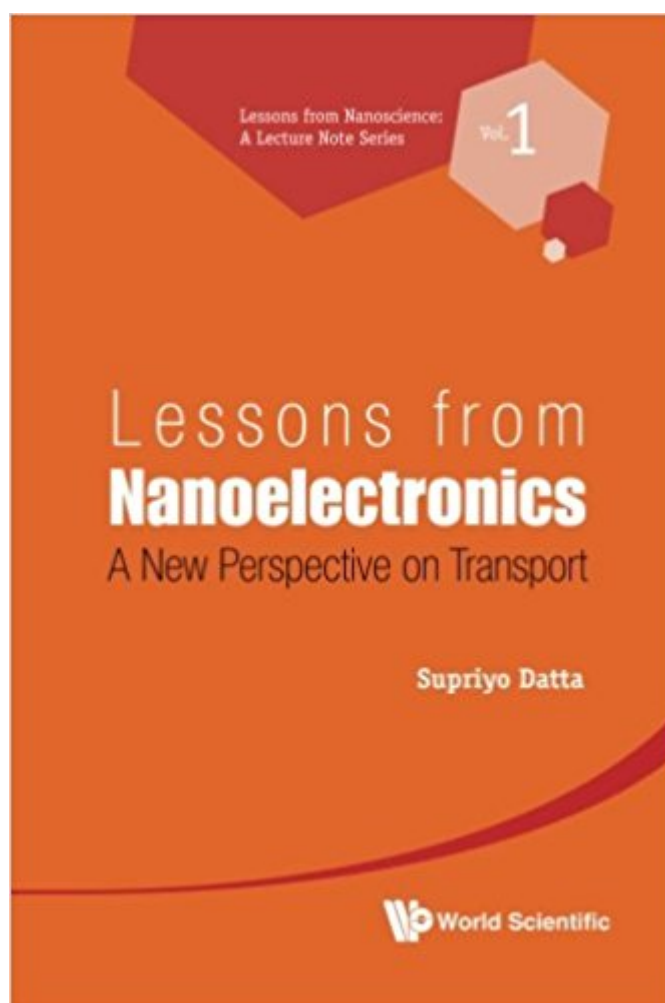


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Lessons From Nanoelectronics: A New Perspective On Transport (Lessons From Nanoscience: A Lecture Note) (Volume 1)



Synopsis

Everyone is familiar with the amazing performance of a modern smart phone, powered by a billion-plus nanotransistors, each having an active region that is barely a few hundred atoms in length. These lecture notes are about a less-appreciated by-product of the microelectronics revolution, namely the deeper understanding of current flow, and device operation that it has enabled, which forms the basis for a new approach to transport problems. The book assumes very little background beyond linear algebra and differential equations, and is intended to be accessible to anyone in any branch of science or engineering.

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Customer Reviews

Everyone is familiar with the amazing performance of a modern laptop, powered by more than a billion nanotransistors, each having an active region that is barely a few hundred atoms long. These lectures, however, are about a less-appreciated by-product of the microelectronics revolution, namely the deeper understanding of current flow, energy exchange and device operation that it has enabled, which forms the basis for what we call the bottom-up approach. The book assumes very little background beyond linear algebra and differential equations, and is intended to be accessible to anyone in any branch of science or engineering. These lectures represent our attempt to make these lessons broadly accessible to those who are not experts in device physics or transport theory, and would like to keep it that way. At the same time, we hope the experts too will enjoy taking a

fresh new look at their favorite subject, emphasizing fundamental insights of general validity.

Supriyo Datta is a Distinguished Professor at Purdue University, and was elected to the US National Academy of Engineering for his work on quantum transport modeling in nanoscale electronic devices. He has received many awards, most recently the Procter Prize for "outstanding contribution to scientific research and demonstrated ability to communicate the significance of this research to scientists in other disciplines."

I am still at the beginning of the 'lectures', but I can tell that this is an indispensable book. It basically gives you a conceptual understanding of the ideas, rather than focusing on the rigorous physics, since that is left for the solid state physics books (but note that at the mesoscopic level there are not many microscopic treatments to start with). In short, if you have a good understanding of elementary solid state physics, and elementary electronics, then to bridge the gap between the microscopic and macroscopic, you need this book. It is a fantastic addition to any personal library.

A very well written and instructive text that can be thought of as a simplified version of "Electronic transport in mesoscopic systems" by the same author. I like the fact that it gives emphasis to qualitative arguments more than strict mathematics.

Go Datta! Helpful examples, and reasoning from the ground-up to build intuition.

An excellent text by professor Datta. You can find his course video lectures on nanohub.org

Good quality!

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