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Introduction -- Fundamentals of Quantum Mechanics -- Fundamentals of Sold-State Physics -- Fundamentals of Statistical Thermodynamics -- Nanoscale Transport Processes -- Microscale and Nanoscale Transport in Single-Phase Fluids -- Phase Change in Minichannels and Microchannels -- Nanofluids -- Measurement Techniques at Microscales and Nanoscales -- Numerical Simulations of Nanoscale Heat Transport.

Sommario/riassunto

This book addresses the fundamentals of Micro and Nanoscale transport in various fields of current interest such as thermal dissipation from electronic devices, thermoelectric energy conversion devices and Micro electro mechanical systems and sensors (MEMS). It provides the understanding of heat transport processes in small dimensions and time scales which is imperative when exploring the unlimited potential that nanotechnology has to offer in areas such as micro/nanoelectronics, MEMS and NEMS, etc. Since the area of micro and nanoscale heat transport is quite interdisciplinary, the book covers the fundamental knowledge of quantum mechanics, statistical thermodynamics, energy states in solids and classical heat transfer. This book is written is an easy-to-comprehend style in order to cover all of the above mentioned subjects without warranting prerequisites from the interested reader. Students from diverse backgrounds such as Mechanical, Aerospace, and Electrical engineering may find it as text for a graduate level course on this subject while practicing engineers may find this book as a useful reference.