



Introduction to Quantum Photonics

By Thomas Pearsall

Springer-Verlag GmbH Jun 2017, 2017. Buch. Condition: Neu. Neuware - This textbook employs a pedagogical approach that facilitates access to the fundamentals of Quantum Photonics. It contains an introductory description of the quantum properties of photons through the second quantization of the electromagnetic field, introducing stimulated and spontaneous emission of photons at the quantum level. Schrödinger's equation is used to describe the behavior of electrons in a one-dimensional potential. Tunneling through a barrier is used to introduce the concept of nonlocality of an electron at the quantum level, which is closely-related to quantum confinement tunneling, resonant tunneling, and the origin of energy bands in both periodic (crystalline) and aperiodic (non-crystalline) materials. Introducing the concepts of reciprocal space, Brillouin zones, and Bloch's theorem, the determination of electronic band structure using the pseudopotential method is presented, allowing direct computation of the band structures of most group IV, group III-V, and group II-VI semiconductors. The text is supported by numerous numerical calculations that can be repeated by the student. The book includes an extensive treatment of the time duration of tunneling. The non-local nature of quantum mechanical states is further developed by the proof of Bell's theorem and an in-depth discussion of its...



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