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Soggetti	Superconductors Superconductivity Optical materials Electronics - Materials Nanotechnology Magnetism Magnetic materials Quantum computers Spintronics Strongly Correlated Systems, Superconductivity Optical and Electronic Materials Nanotechnology and Microengineering Magnetism, Magnetic Materials Quantum Information Technology, Spintronics Llibres electrònics
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Nota di contenuto	Introductory Notes on the Josephson Effect: Main Concepts and Phenomenology -- Josephson Devices as Tests of Quantum Mechanics Towards the Everyday Level -- Basic Properties of the Josephson Effect -- Charge Transport in Unconventional Superconductor Junctions -- Mesoscopic Features in Nanoscale Superconducting Devices --

Magnetic Field Effects in Josephson Junctions -- Current—Voltage Characteristics -- High Critical Temperature Superconductor Josephson Junctions and Other Exotic Structures -- Pairing Symmetry Effects -- Intrinsic Josephson Junctions in High Temperature Superconductors -- Phase Dynamics and Macroscopic Quantum Tunneling -- High Frequency Properties of Josephson Junctions -- Josephson Effect in Graphene and 3d Topological Insulators -- Physics and Applications of NanoSQUIDs -- Josephson Junctions for Metrology Applications -- Josephson Junctions for Digital Applications -- Quantum Bits with Josephson Junctions -- Quantum Superconduction Networks: From Josephson to QED Arrays -- Josephson Effects in Superfluid Helium -- Weak Link for Ultracold Bosonic Gases.

Sommario/riassunto

This book provides a comprehensive and up-to-date description of the Josephson effect, a topic of never-ending interest in both fundamental and applied physics. In this volume, world-renowned experts present the unique aspects of the physics of the Josephson effect, resulting from the use of new materials, of hybrid architectures and from the possibility of realizing nanoscale junctions. These new experimental capabilities lead to systems where novel coherent phenomena and transport processes emerge. Recent examples include, for instance, the use of Josephson junctions for the detection of Majorana fermions and for superconducting qubits. All this is of great relevance and impact, especially when combined with the didactic approach of the book. The reader will benefit from a general and modern view of coherent phenomena in weakly-coupled superconductors on a macroscopic scale. Topics that have been only recently discussed in specialized papers and in short reviews are described here for the first time and organized in a general framework. An important section of the book is also devoted to applications, with focus on long-term, future applications. In addition to a significant number of illustrations, the book includes numerous tables for comparative studies on technical aspects. .