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Titolo	Theory of high temperature superconductivity [[electronic resource] /] / by Shigeji Fujita and Salvador Godoy
Pubbl/distr/stampa	Dordrecht ; ; Boston, : Kluwer Academic Publishers, c2001
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Descrizione fisica	1 online resource (XIX, 374 p.)
Collana	Fundamental theories of physics ; ; v. 121
Altri autori (Persone)	FujitaShigeji GodoySalvador
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Soggetti	High temperature superconductivity Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references (p. 355-357) and index.
Nota di contenuto	Superconducting Transition -- Bloch Electrons -- Phonon-Exchange Attraction -- Quantum Statistical Theory -- Cooper Pairs (Pairons) -- Superconductors at 0 K -- Quantum Statistics of Composites -- Bose-Einstein Condensation -- The Energy Gap Equations -- Pairon Energy Gaps. Heat Capacity -- Quantum Tunneling -- Flux Quantization -- Ginzburg-Landau Theory -- Josephson Effects -- Compound Superconductors -- Lattice Structures of Cuprates -- High-Tc Superconductors Below Tc -- Doping Dependence of Tc -- Transport Properties Above Tc -- Out-of-Plane Transport -- Seebeck Coefficient (Thermopower) -- Magnetic Susceptibility -- Infrared Hall Effect -- d-Wave Cooper Pairs -- Connection with Other Theories -- Summary and Remarks.
Sommario/riassunto	Flux quantization experiments indicate that the carriers, Cooper pairs (pairons), in the supercurrent have charge magnitude 2e, and that they move independently. Josephson interference in a Superconducting Quantum Int- ference Device (SQUID) shows that the centers of masses (CM) of pairons move as bosons with a linear dispersion relation. Based on this evidence we develop a theory of superconductivity in conventional and mate- als from a unified point of view. Following Bardeen, Cooper and Schrieffer (BCS) we regard the phonon exchange attraction as the cause of superc- ductivity. For cuprate superconductors, however, we take account of both optical- and

	acoustic-phonon exchange. BCS started with a Hamiltonian containing “electron” and “hole” kinetic energies and a pairing interaction with the phonon variables eliminated. These “electrons” and “holes” were introduced formally in terms of a free-electron model, which we consider unsatisfactory. We define “electrons” and “holes” in terms of the cur- tures of the Fermi surface. “Electrons” (1) and “holes” (2) are different and so they are assigned with different effective masses: Blatt, Schafroth and Butler proposed to explain superconductivity in terms of a Bose-Einstein Condensation (BEC) of electron pairs, each having mass M and a size. The system of free massive bosons, having a quadratic dispersion relation: and moving in three dimensions (3D) undergoes a BEC transition at where is the pair density.

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Soggetti	Educational leadership
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