



Theory of High Temperature Superconductivity: A Conventional Approach

By Todor M. Mishonov, Evgeni S. Penev

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Drawing from the broad spectrum of phenomena, described in more than 100,000 articles on high-T_c superconductivity, in this book, the authors analyze those basic properties for which understanding can be achieved within the framework of traditional methods of theoretical physics.

This is the case of the overdoped cuprates for which the "Bardeen program" has been realized: We know their electronic spectrum, we can calculate their basic thermodynamic and electrodynamic properties, and predict new phenomena. The book gives a pedagogical derivation of formulas describing the electron band structure, penetration depth, specific heat, fluctuation conductivity, etc. Prediction of plasmons and their application for a new type of THz generators is considered as well.

The book advocates that the strongest exchange interaction in condensed matter physics -- the intraatomic s-d exchange -- is the long sought pairing mechanism in overdoped cuprate superconductors.

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