

QUASIPARTICLE SPECTRA AND PSEUDOGAP PHENOMENA IN HIGH- T_c SUPERCONDUCTORS

V.M. Loktev

Bogolyubov Institute for Theoretical Physics,
Nat. Acad. Sci. of Ukraine
(14b, Metrolohichna Str., Kyiv 03143, Ukraine)

S u m m a r y

We attempt to discuss the present status of the high-temperature superconductivity theory. The main experimental data and theoretical approaches suggested for their interpretation are briefly summarized. We emphasize one of the most unexpected features of high- T_c superconducting copper oxides — the existence of a pseudogap in their quasiparticle spectrum, or the suppression of the density of states in a vicinity of the Fermi surface. The theory of the phase fluctuations of the order parameter is presented. It leads to the idea of that the high- T_c superconducting transition in cuprates is the Berezinskii—Kosterlitz—Touless transition when a homogeneous condensate is not formed. We discuss the peculiarities of physical properties of superconducting compounds which cause the absence of the well-defined Fermi-type quasiparticles. This demonstrates that their description in the framework of the standard Landau theory Fermi liquid is not possible. We stress the special role of dopants: without them, copper oxides are just nothing more than antiferromagnetic insulators.