

BCS-Bose condensation crossover in anisotropic superconductors

B. Tobijaszevska and R. Micnas

Institute of Physics, Adam Mickiewicz University, ul. Umultowska 85,
PL-61-614 Poznań , Poland

We analyze the crossover from BCS to local pair (LP) superconductivity for the $d_{x^2-y^2}$ -wave pairing symmetry in the ground state. The thermodynamic and spectroscopic characteristics of the extended Hubbard model with intersite electron pairing are obtained for the $2D$ square lattice. The two crossover scenarios, density driven and interaction driven, are compared. The influence of the next-nearest neighbors hopping (t_2) on the crossover is discussed. For $|t_2/t| < 0.5$ crossover is simultaneous with the vanishing of nodal points in the quasiparticle energy, whereas for $|t_2/t| > 0.5$ the crossover is similar to that of s -wave type. The vanishing of nodal points is clearly reflected in superconducting characteristics.

9.7 cm

13.4 cm

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Corresponding author :

B. Tobijaszevska

Address for correspondence :

Solid State Theory Division, Institute of Physics, Adam Mickiewicz University,
ul. Umultowska 85, PL-61-614 Poznań , Poland

Email address :

bch@amu.edu.pl