MAR08-2007-000718

Abstract for an Invited Paper
for the MAR08 Meeting of
the American Physical Society

Nodal/Antinodal Dichotomy and the Two Gaps of a Superconducting Doped Mott Insulator

MARCELLO CIVELLI, Institut Laue Langevin

Using Cellular Dynamical Mean Field Theory, implemented with exact diagonalization as impurity solver, we study the superconducting state of the hole-doped two-dimensional Hubbard model. We mainly focus on qualitative aspects which characterize the approach to the Mott transition. We will show that our formalism leads to a natural decomposition of the photoemission energy-gap into two components. A first gap, stemming from the anomalous self-energy, dominates near the nodes and decreases with decreasing doping. The second gap has an additional contribution from the normal self-energy, inherited from the normal-state pseudo-gap. It is dominant near the antinodes and increases as the Mott insulating phase is approached. This behavior of the one-particle gap is relevant in the light of recent experimental studies reporting the presence of two different energy scales in the nodal and antinodal regions of high-temperature superconductors.