

Chez Pierre

Presents ...

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MIT Room 4-331



Peter Johnson

Brookhaven National Laboratory

“A particle-hole asymmetry and the pseudogap phase of the High-T_c superconductors”

In the pseudogap phase of the cuprate superconductors, a significant portion of the Fermi surface is still gapped at temperatures above the transition temperature T_c . Instead of a closed Fermi surface, the low-energy electronic excitations appear to form unconnected Fermi arcs separated by gapped regions. It is generally assumed that the spectral function is particle-hole symmetric (at low energies) in both regions - with a peak at the Fermi level on the Fermi arcs centered around the nodes and a local minimum at the Fermi level in the gapped regions away from the arcs. Using high resolution angle-resolved photoemission and new methods of analysis, we show that on a sizable portion of the Fermi surface, including the Fermi arcs, the electronic structure in the immediate vicinity of the Fermi level is not particle-hole symmetric in the pseudogap phase. This is clear evidence that superconducting pairing does not originate from the Fermi arcs. However there is evidence for pre-formed pairs along the copper-oxygen bond directions. The observations are also consistent with the possibility that the Fermi arcs are in fact the inner surface of predicted Fermi pockets.