

MAR07-2006-003695

Abstract for an Invited Paper
for the MAR07 Meeting of
the American Physical Society

Magnetic Excitations and the Exchange Energy Available for Superconductivity

THOMAS DAHM, University of Tuebingen

We have made detailed comparisons of theoretical calculations and experimental neutron scattering results in absolute units in order to determine the temperature change of the nearest neighbor spin correlations in optimally doped YBCO as one goes from the normal to the superconducting state [1]. This allows us to estimate the magnetic exchange energy change that becomes available for superconducting condensation. Our results show that the available magnetic energy change is about 10-15 times larger than the energy necessary for superconducting condensation [1]. We discuss the issue of the spin sum rule and implications for a spin fluctuation driven pairing interaction as well as implications for low energy excitations in angular photoemission spectroscopy [2].

[1] H. Woo et al, Nature Physics 2, 600 (2006).

[2] T. Dahm et al, Phys. Rev. B 72, 214512 (2005).