Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Local antiferromagnetic exchange and collaborative Fermi surface as key ingredients of high temperature superconductors JIANGPING HU, Purdue University, HONG DING, Institute of Physics, Chinese Academy of Sciences — Cuprates, ferropnictides and ferrochalcogenides are three classes of unconventional high-temperature superconductors, who share similar phase diagrams in which superconductivity develops after a magnetic order is suppressed, suggesting a strong interplay between superconductivity and magnetism, although the exact picture of this interplay remains elusive. Here we show that there is a direct bridge connecting antiferromagnetic exchange interactions determined in the parent compounds of these materials to the superconducting gap functions observed in the corresponding superconducting materials. High superconducting transition temperature is achieved when the Fermi surface topology matches the form factor of the pairing symmetry favored by local magnetic exchange interactions. Our result offers a principle guide to search for new high temperature superconductors. References: Jiangping Hu and Hong Ding, Arxiv:1107.1334 (2011)

Jiangping Hu
Purdue University

Date submitted: 29 Nov 2011 Electronic form version 1.4