复旦大学物理系物质科学报告

Quantiative Determination of the the Fluctuations Leading to Superconductivity in Cuprates

Physics Department Colloquium

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I will report on Laser based ARPES of unprecedented accuracy and stability (taken by the group of Xingjiang Zhou, IOP, Beijing), together with a method of analysis suggested by me (and carried out with the group of Han-Yong Choi, Asia Pacific Center for Theoretical Physics, Korea), to quantitatively extract the effective frequency and momentum dependent interactions of fermions in both the full symmetry (normal) and the d-wave (pairing) symmetry in a fam- ily of cuprates. The results are remarkably simple. The principal interactions are of the form:

$$I(k,k',\omega)\approx g\_0(1-\cos(2\theta\_k)\cos(2\theta'\_k)\, F(\omega).$$

They are separable functions of momentum and frequency, the first part is the repulsive part and the second part is the attractive

d-wave part. F(ω) is nearly constant with an upper-energy cut-off of about 0.4eV.The dimensionless coupling constant g_0 ≈ 0.15. These results were predicted in a theory of super- conductivity and of the strange metal phase by quantum-critical fluctuation of loop-currents. They also rule out several alternatives proposed. I will also com- ment on the normal state and superconductivity in the Fe-based compounds.

Time：2:00pm,Wednesday, 2016.04.27

Location：Physics Building, Room 221B

(Cookies and coffee are served from 1:45 pm)