Chez Pierre

Presents ...

Monday, October 2, 2023

12:00 pm -1:00 pm

Duboc Room – 4-331

Chez Pierre Seminar

Zhi-Xun Shen, Stanford University

"Surprises in the Phase Diagram – Electron Doped Cuprates".

In the cuprate research, much focus has been on the hole doped side, with less attention on the electron doped side – presumably related to lower transition temperature. In this talk, I discuss recent surprises in the electronic phase diagram of n-type curpates: i) Bogliubov quasiparticle on gossamer Fermi surface – where we found that the superconductivity is maximized not at the antiferromagnetically reconstructed Fermi surface, rather at the antiferromagnetic "hot spot" where the Fermi surface is otherwise maximally gapped by the antiferromagnetic pseudogap [1]; ii) Anomalous normal state gap – where we found that the perceived antiferromagnetic metal per reconstructed Fermi surface in the underdoped regime with long range antiferromagnetic order is further gapped by effect beyond the antiferromagnetism. After considering all the known ordering tendencies in tandem with the phase diagram, we hypothesize that this gap originates from Cooper pairing- at much higher temperature scale than previously thought [2].

[1] Ke-Jun Xu, Qinda Guo, Makoto Hashimoto, Zi-Xiang Li, S.D. Chen, J.F. He, Yu He, Gong Li, M.H. Berntsen, C.R. Rotundu, Y.S. Lee, T.P. Devereaux, A. Rydh, D.H. Lu, D.H. Lee, O. Tjernberg, Z.-X. Shen, Nature Physics, to appear.

[2] Ke-Jun Xu, J.F. He, S. Abadi, S.D. Chen, Yu He, C.R. Rotundu, Y.S. Lee, D.H. Lu, Qinda Quo, O. Tjernberg, T. P. Devereaux, D.H. Lee, M. Hashimoto, Z.-X. Shen, under review