Condensed Matter Seminar

Thursday

December 7

4:00 P.M.

Rm 184 NSH

Spectroscopic-STM studies of FeSe single crystals

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In spite of its simple crystal structure, the electronic properties of the iron-based superconductor FeSe (Tc ~ 9 K) are rich and attractive. Superconductivity in FeSe takes place in a so-called nematic phase that is associated with orbital ordering. Another interesting aspect is that Fermi wave length is as long as the coherence length therefore, placing FeSe most likely in the BCS-BEC crossover regime. These features should result in non-trivial electronic states around the local defects such as vortices and impurities. We have performed spectroscopic-imaging STM experiments on FeSe to investigate its electronic structures. There are two superconducting gaps in the spectrum; the larger one (~ 2.5 meV) is on the hole band at the Brillouin-zone center and the smaller one (~ 1.2 meV) is on the electron pocket at the zone corner. Multiband superconductivity aspects, symmetry of the order parameter, role of disorder, vortex matter and chemical substitution effects on the band structure of this system will be discussed.

PHYSICS