

TcSUH Bi-Weekly Seminar

Texas Center for Superconductivity at the University of Houston



Prof. Shuheng H. Pan

Professor of Physics

TcSUH PI, Scanning Probe Laboratory

Direct Probe of the Key Building Block of the Fe-based Superconductors with Scanning Tunneling Microscopy/Spectroscopy (STM/S)

Thursday, April 23, 2009

Room 102, University of Houston Science Center

12:00 noon - 1:00 p.m.

Abstract

The recently discovered superconductivity in iron (Fe)-based compounds is another exciting advancement in condensed matter physics since the discovery of high- T_c superconductivity in cuprates. Using a UHV Low Temperature Scanning Tunneling Microscope, we have been studying the structural and electronic properties of the parent and Co-doped BaFe_2As_2 compound. We find that, by low temperature in situ cleaving, we are able to expose the key building block – the Fe-As layer of this compound, where superconductivity is believed to occur. With STM/S, we directly probe this key building block with spatial resolution down to atomic scale. STM is a surface sensitive technique. Keeping this in mind, I will demonstrate how we use this high real-space resolution and surface sensitive technique to learn the structural and electronic properties within the bulk. I will also discuss our results on the density-of-states (DOS) evolution with doping, the scaling of the superconducting energy gap, and some electronic local effects that may be used to help determine the pairing symmetry.

Bio

Prof. Shuheng H. Pan received his Ph.D. from The University of Texas at Austin in 1991 under the guidance of Prof. Alex de Lozanne. After conducting postdoctoral research at the University of Basel, Switzerland, he helped to establish the Microstructure Research Center, a National Research Laboratory, at the University of Hamburg, Germany. In 1995, he joined the Ultra Low Temperature Physics Group as a Research Associate at the University of California at Berkeley. In 1999, he became a faculty member of the Physics Department at Boston University. In 2001, he returned to Texas and became a faculty member of the Physics Department and a Principal Investigator at the Texas Center for Superconductivity at the University of Houston (TcSUH), where he conducts research on strongly correlated materials and novel superconductors. He is Project Leader of the TcSUH Scanning Tunneling Microscopy and Spectroscopy Laboratory.

Persons with disabilities who require special accommodations in attending this lecture should call (713) 743-8210 as soon as possible.



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