

TCSUH SPECIAL SEMINAR

Prof. Shuheng Pan

Institute of Physics, Chinese Academy of Sciences, Beijing, China

Thursday, April 11, 2024

In Person: Houston Science Center (HSC), 102

12:00 p.m. – 1:00 p.m. *Sandwiches Provided*

Development of an Ultra-low Temperature High Magnetic Field Rotational STM for Research of Quantum Materials



ABSTRACT: In the study of quantum materials, external magnetic field is often used to tune the electronic properties during measurements. In addition to varying the magnitude of the field, one also needs to rotate the field direction relative to the sample. The common method to obtain a rotational magnetic field is by using the vector-magnet technique. However, this technique is limited to only 2-3 Tesla, due to the limitation of the mechanical strength of the materials used in the structure that supports the orthogonal magnets. In this talk, I will present our proposal to build a rotational STM inside a high magnetic field and the 10 years' effort of realizing this innovative idea. The completed ultra-high vacuum STM system can reach a base temperature of 3.5 mK and the STM scan-head can rotate about 2 axes at ultra-low temperature and in a magnetic field up to 18 Tesla. I will also present some of the preliminary experimental results during the course of the research and development of this grand instrumentation.

BIO: Shuheng H. Pan is a distinguished professor and National Expert in the Institute of Physics, Chinese Academy of Sciences and Beijing National Laboratory for Condensed Matter Physics. He received his B.S. from Soochow University in China (1982) and Ph.D. from the University of Texas, Austin, USA (1990). After two years of postdoctoral research at the University of Basel in Switzerland, he accepted the offer, became a national research staff member of the applied physics department at the University of Hamburg in Germany, and participated in establishing the National Laboratory for Microstructure Research in Hamburg. In 1995, he returned to the United States and joined the ultra-low temperature physics group in the physics department of the University of California, Berkeley. In 1999, he became an associate professor of the physics department at Boston University. In 2001, he moved to the University of Houston and became a tenured full professor of the Physics department and the Texas Center for Superconductivity. In 2011, he joined the Institute of Physics CAS for research in superconductivity and strongly correlated electron systems and development of advanced scanning tunneling microspectroscopic instruments.

Host: Prof. C. S. Ting, cting2@central.uh.edu

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