T_CSUH Special Seminar

Texas Center for Superconductivity at the University of Houston

Prof. Xiaoxing Xi

The Pennsylvania State University
University Park, Pennsylvania

"Hybrid Physical-Chemical Vapor Deposition for MgB_2 Coated-Conductors"

Tuesday, December 12, 2006
Room 102, University of Houston Science Center
12:00 Noon – 1:00 p.m.

Abstract

MgB_2 thin films and coated-conductor fibers, grown by Hybrid Physical-Chemical Vapor Deposition (HPCVD), show extraordinarily high values of upper critical field H_{c2} (over 60 T) and irreversibility field H_{irr} (over 40 T), which are much higher than those of Nb-based superconductors. This is the result of two-band superconductivity, a unique feature of MgB_2, and the modification of the inter-band and intra-band scattering of the two bands. The carbon alloying also dramatically increases the critical current density in magnetic field. The carbon content-dependence of the lattice constants in the HPCVD films are found to be different from those in bulk carbon-doped MgB_2, which may explain their superior high field properties. Coated conductor wires and tapes are a potentially viable approach to turn such properties into practical high-field conductors for applications such as magnetic resonance imaging.

Bio

Xiaoxing Xi is a Professor of Physics and Materials Science and Engineering at the Pennsylvania State University. He received his PhD degree in Physics from Peking University, China, in 1987. After several years of research at Karlsruhe Nuclear Research Center, Germany, Bell Communication Research/Rutgers University, and University of Maryland, he joined the faculty of the Department of Physics at Penn State in 1995. He is a recipient of the NSF CAREER Award and a Chang Jiang Scholar at Tsinghua University, China. His research focuses on the materials physics relating to metal-oxide and boride thin films. He has published over 200 papers in refereed journals and holds three patents in the area of thin films of high T_c superconductors, ferroelectrics, and magnesium diboride, among others.

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