

# T<sub>C</sub>SUH Special Seminar

Texas Center for Superconductivity at the University of Houston

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### “Probing interfacial defects in YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-δ</sub> films and their effects on transport properties”

**Thursday, May 4, 2006**

Room 102, University of Houston Science Center  
12:00 noon – 1:00 p.m.

#### Abstract

Wires that carry electrical current without resistance are fabricated by coating metal substrates with the high-temperature superconductor YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-δ</sub> (YBCO). One problem with this material is that its current-carrying ability ( $J_c$ ) is decreasing as film thickness increases, namely YBCO thickness dependence. Another problem is that its  $J_c$  is dramatically reduced by the presence of a magnetic field, and many envisioned applications, such as magnets, motors, generators and transformers, require operation in a moderate-to-strong field. Recently, significant progress has been made to overcome these two challenges using multilayer architecture and nano-particle doping approaches. These additional interfaces and grain boundaries create extra interfacial defects in the YBCO that will pin magnetic flux lines and prevent the dissipative motion that degrades performance. In this talk, several successful examples for improving both YBCO  $J_c$  self-field and  $J_c$  in-field will be introduced and correlated with the microstructure characteristics of these additional defects.

#### Bio

Haiyan Wang is an Assistant Professor in the Department of Electrical and Computer Engineering at Texas A&M University. She received her PhD in Materials Science Engineering from North Carolina State University (2002), M.S. from the Institute of Metal Research (China-1999), and B.S from Nanchang University (China-1998). Before joining TAMU, she was a Director Funded Postdoctoral Fellow (2003-2005) and Technical Staff Member (2005) at Los Alamos National Laboratory. Prof. Wang received the 2005 TMS Young Leader award, representing the Electronic, Magnetic and Photonic Materials Division., and the Materials Research Society Graduate Student Award (silver medal in the annual 2001 international level competition).

Her research interests include nanostructured nitride and oxide thin film heterostructures for microelectronics, optoelectronics, magnetic and structural applications; coated superconductor materials scale-up and architectures; flux-pinning mechanisms of nanoparticles and defects in high temperature superconductors; and microstructural characterizations with TEM, high resolution TEM, STEM and XRD. She has published 67 journal articles and 40 conference presentations and proceedings, and has eight patents. She also serves as Committee Member of the Electronic, Magnetic and Photonic Materials Division of the Minerals, Metals and Materials Society, and is a member of the Materials Research Society, American Society of Metals, Minerals, Metals and Materials Society, and American Physical Society.

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