

T_CSUH Special Seminar

Texas Center for Superconductivity at the University of Houston

Bai-ru Zhao

Professor, Institute of Physics, Chinese Academy of Sciences



“Coexistence of Superconductivity and Ferromagnetism in Dilute Co-doped $\text{La}_{1.89}\text{Ce}_{0.11}\text{CuO}_{4+\delta}$ ”

Friday, April 28, 2006

Room 102, University of Houston Science Center

12:00 noon – 1:00 p.m.

Abstract

The thin films of the optimally electron doped T'-phase superconductor $\text{La}_{1.89}\text{Ce}_{0.11}\text{CuO}_{4\pm\delta}$ (LCCO) are investigated under the dilute Co doping, which are formulated as the $\text{La}_{1.89}\text{Ce}_{0.11}(\text{Cu}_{1-x}\text{Co}_x)\text{O}_{4\pm\delta}$ (LCCCO) with $x = 0.01 - 0.05$. In this whole Co concentration range, the ferromagnetic ordering is observed which is suggested to be formed through the RKKY interaction. In the case of very low Co concentration, $x = 0.01$ and 0.02 , the coexistence of superconductivity and ferromagnetism is obviously detected. For such formulated LCCCO (substitution of Co for Cu), all these facts should take place in the CuO_2 plane. This let us believe that there may be two kinds of charge carriers (electrons and holes) in the LCCO system, as has been suggested for other electron-doped high- T_c superconductors. In this talk, the anisotropic transport property of $(\text{La,Ce})_2\text{CuO}_4$ will also be reported.

Bio

Bai-ru Zhao is a Professor at the Institute of Physics, Chinese Academy of Sciences, where he has worked on superconductivity since September 1966. His major topics of research have included: Superconducting gravimeter (1970 - 1979); Thin films and superconducting tunneling spectroscopy for A15 phase Nb_3Ge , Chevrel phase CuMo_6S_8 and B1 phase VN and MoV superconductors (1980 - 1986); Starting to develop high- T_c superconductor thin films, $(\text{La,Sr})_2\text{CuO}_4$, $\text{YBa}_2\text{Cu}_3\text{O}_7$ in China (National program) (1986 - 1988); Electronic phase and electronic phase separation of high- T_c cuprate superconductors (1996 - 2002); and Electron-doped superconductor thin films, the transport property, and the interaction between superconductivity and ferromagnetism (2002-present). Prof. Zhao has authored over 160 publications, one book, *High- T_c Superconductor Thin Films*, and one chapter in *Handbook of Thin Film Materials*. He has received the special grade prize of the progress of science and technology of CAS (1998), the first grade prize of the progress of science and technology of CAS, and the second grade of the national prize of the progress of science and technology. Additional professional experiences have included Visiting Scholar, University of California, San Diego (August 1981 - January 1984); Regular Associate Professor (employed by the Ministry of Education of Japan), Kyushu University, Fukuoka, Japan (August 1989 - September 1991); and Regular Professor (employed by the Ministry of Education of Japan), Kyushu University, Fukuoka, Japan (November 1995 - March 1996).

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



TEXAS CENTER FOR
SUPERCONDUCTIVITY