

T_cSUH Bi-Weekly Seminar

Texas Center for Superconductivity at the University of Houston

Prof. Bernd Lorenz

Texas Center for Superconductivity and Department of Physics



Fe-As Based High-Temperature Superconductors: The Breakthrough of the Year (2008)

Friday, April 3, 2009

Room 102, University of Houston Science Center

12:00 noon – 1:00 p.m.

Abstract

The discovery of superconductivity in rare earth (R) oxypnictides, RFeAs, by Hosono et al. has revived the field of high-temperature superconductivity. With transition temperatures of up to 55 K the new class of superconducting compounds has given hope to reach even higher T_c 's exceeding those of the copper oxide superconductors. At the same time, questions have been raised concerning possible similarities and differences between the two high- T_c systems with the perspective that studying the FeAs superconductors might also help to better understand the cuprates. I will present a brief overview of some recent results and discuss examples of FeAs-based superconductors crystallizing in different basic structure types: (i) The PbFCl-type structure (LiFeAs) and (ii) the ThCr₂Si₂-type structure (AFe₂As₂, A=K, Rb, Cs, and the solid solution (K/Sr)Fe₂As₂). The ternary compounds are all self-doped superconductors. The (K/Sr)Fe₂As₂ – system reveals an interesting phase diagram that seems to be generic to most FeAs-systems, with a maximum T_c at an optimal composition and a spin density wave (SDW) state at the Sr-rich side. The extrapolation of the SDW phase boundary suggests the possible existence of a quantum critical point. Evidence for quantum critical scaling is found in resistivity and thermoelectric measurements.

Bio

Bernd Lorenz received his Ph.D. degree in Physics in 1975 (University of Leipzig, Germany) and his D.Sc. and “Facultas Docendi” in Theoretical Physics in 1991. He worked as a Research Associate at the University of Leipzig (1975-1985), the Institute of High Pressure Research in Potsdam (1985-1990), and as the Head of the High Pressure Physics Group at the University of Potsdam (1990-1996). He spent 15 months at the Colorado State University, Fort Collins, CO as a Visiting Professor in 1993/94. In 1996 Dr. Lorenz joined the Texas Center for Superconductivity at the University of Houston where he is working now as a Research Professor in the High-Pressure Low-Temperature Group. His research interests are in the field of condensed matter physics, including superconductivity, magnetism, ferroelectricity, metal-insulator transitions, etc.

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



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