

T_CSUH Special Seminar

Texas Center for Superconductivity at the University of Houston

Dr. T. K. Lee

Institute of Physics, Academia
Sinica, Taipei, Taiwan



“The Low-Energy Inhomogeneous States of the t- J Model”

Friday, April 24, 2009

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

NOTICE

(Sandwiches Available at 11:45 a.m.) RSVP to Annie Foster - afoster@uh.edu
or please call (713) 743-8210 by Thursday, April 23, 2009

Abstract

By using a variational approach it is shown that periodic stripe states or randomly oriented stripe states are almost degenerate in energy with the uniform d-wave superconducting state in the t-J type models. It provides a simple explanation for the observation of the cluster-glass state in BSCO high temperature superconductors. There is no need to introduce other competing interactions to obtain these inhomogeneous states. However, to stabilize a long-range-order stripe state as seen in LaBaCuO with 1/8 doping, we propose a new model to include in the t-J model the short-ranged hopping modulations due to mass renormalization by electron-phonon coupling. In addition, our results show that the most stable stripe will have its charge modulation period scales with $1/2x$ where x is the hole density. Hence we are able to explain the so called Yamada plot observed in neutron scattering experiment.

Bio

T. K. Lee received the B.S. degree from National Taiwan University (Taipei) in 1971, and the Ph.D. in Physics from Brown University in 1975. He was a Research Associate in the Department of Physics at City College of City University, New York, from 1975 to 1979, and at the Institute for Theoretical Physics at the University of California at Santa Barbara from 1979 to 1981. He was Assistant Professor and Professor of Physics at Virginia Polytechnic Institute and State University, Blacksburg, VA, from 1982 to 1997. In 1996, he became a Research Fellow at the Institute of Physics, Academia Sinica in Taipei, and in 1997, also became Head of the Physics Division, National Center for Theoretical Sciences, Hsinchu, Taiwan. From 1997 to 2002, he was Outstanding Scholarship Chair. Dr. Lee's research interests include high temperature superconductivity, nano-materials, X-ray crystallography, protein structure, protein folding, and Quantum Monte Carlo method.

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



TEXAS CENTER FOR
SUPERCONDUCTIVITY