



THE CHINESE UNIVERSITY OF HONG KONG  
Department of Physics  
**COLLOQUIUM**

# Neutron Scattering Studies of Iron Arsenide Superconductors

*by*

**Professor Pengcheng Dai (戴鹏程教授)**

The University of Tennessee / Institute of Physics, CAS /  
Oak Ridge National Laboratory

*Date: December 10, 2009 (Thursday)*

*Time: 4:00 - 5:00 p.m.*

*Place: L4, Science Centre, CUHK*

*(Light refreshments will be served 20 minutes prior to the colloquium.)*

ALL INTERESTED ARE WELCOME

\*\*\*\*\*

---

## Abstract

In this condensed matter seminar, I describe the most recent progress in the field of iron-based superconductors. Using neutron scattering as a probe, we study spin excitations in FeAs-based superconductors and its undoped parent compounds. For the undoped  $\text{CaFe}_2\text{As}_2$ , we determine the entire spin wave dispersion curve and show that magnetic exchange coupling has strong in-plane exchange anisotropy with no evidence for Stoner continuum. Upon doping to induce superconductivity, we find that the spin excitations spectrum is dominated by a large spin gap and a neutron spin resonance. We show that the resonance is directly connected with superconducting electronic gap. These results suggest that spin excitations are the most promising candidate for electron pairing and superconductivity in iron-based superconductors.

Enquiries: 2609 6339