



THE CHINESE UNIVERSITY OF HONG KONG
Department of Physics
COLLOQUIUM

**Common Physics Mechanism of
the Fe-Based Superconductors
Revealed By Neutron Scattering Research**

by



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ALL INTERESTED ARE WELCOME

Abstract

Neutron scattering couples to both the lattice and magnetic degrees of freedom of condensed matter, and detects both static and dynamic excitation processes. Thus it is a powerful tool to explore and determine fundamental microscopic mechanism of novel materials. We report the results of neutron scattering investigation on various families of the Fe-based unconventional superconductors. The 3d orbital ordering is shown to be the common fundamental mechanism to determine the structural as well as the antiferromagnetic transitions for all the families. Inelastic resonance peak is used to demonstrate the triplet nature of the Cooper pairs. The Anderson localization-like behaviour shows the superconducting systems as close to a metal-insulator transition. These experimental discovery shall provide essential inputs to construct the theoretic model which underlies the high-T_c superconductivity of the families of the Fe-based materials.