

MAR10-2009-020111

Abstract for an Invited Paper
for the MAR10 Meeting of
the American Physical Society

Magnetism in Fe Pnictides and Chalcogenides Probed by Neutron Scattering

HERBERT MOOK, Oak Ridge National Laboratory

There has recently been considerable discussion on relationship between magnetism and superconductivity in the recently discovered Fe based superconductors. The original materials were discovered when Fe was doped into LaFeAsO and higher transition temperatures obtained with substitutions for La. Even simpler superconductors could be made with the Fe(TeSe) system and neutron scattering has uncovered quite unusual behavior in these materials. At low temperatures static magnetism was found at the $(1/2, 0, 1/2)$ lattice position for FeTe, but this disappeared as Te was replaced by Se in which case steep incommensurate excitations were found on either side of the $(1/2, 1/2, 0)$ position. As the Se was further increased the incommensurate excitations became closer to the $(1/2, 1/2, 0)$ and the material becomes superconducting with a resonance at exactly $(1/2, 1/2, 0)$. Neutron scattering will be used to show how the magnetism and superconductivity interact in the FeSeTe and other materials of interest.