SEMINARIUM Z MAGNETYZMU I NADPRZEWODNICTWA

Uprzejmie zawiadamiamy, że w **ŚRODĘ**

28 maja 2008 r., o godz. 10:00

w sali 203 (bud. 1) odbędzie się seminarium, na którym

Dr Manuel Angst

Materials Science and Technology Division, Oak Ridge National Laboratory

wygłosi referat na temat:

„Interplay of Charge Order and Magnetism in Multiferroic $LuFe_2O_4$"

$LuFe_2O_4$ was recently proposed to exhibit ferroelectricity arising from charge order (CO), a novel mechanism potentially providing a route to practical multiferroics, materials with interacting magnetism and ferroelectricity. The subsequent discovery of a giant magneto-dielectric effect at room temperature suggested a direct potential for applications of this material. Although RFe_2O_4 compounds with various rare earth elements R have been known and studied for 30 years, neither the CO nor the also present magnetism are well understood. We have recently grown single crystals of $LuFe_2O_4$ with improved homogeneity, and investigated them mainly by scattering methods.

In this seminar, I will discuss growth and bulk properties, and the magnetism and CO based on neutron and synchrotron scattering studies. The ferroelectricity will also be addressed. Neutron scattering studies established a clearly three-dimensional nature of the magnetic interactions, with the magnetic structure at 220 K refined as a ferrimagnetic spin configuration. Below a new transition at 175 K transition, changes in peak intensities and width, the buildup of a diffuse component to the scattering, and the appearance of magnetic scattering at incommensurate positions may be interpreted as an admixture of a phase with antiferromagnetic spin configuration and incommensurations. Superstructure reflections by synchrotron x-ray scattering appear below 320 K and are attributable to CO when combined with Mossbauer spectral results. The scattering results surprisingly suggest a CO configuration with no net electric polarization. The temperature dependence of a slight incommensuration of the CO indicates a substantial coupling between the charge and spin degrees of freedom.

Serdecznie zapraszamy

Roman Puźniak
Henryk Szymczak
Andrzej Wiśniewski