structure at x = 0.5. Low Mn doping sample (x < 0.5) comprises paramagnetic and ferrimagnetic states and high Mn contained samples (x > 0.5) become a ferrimagnetic and antiferromagnetic states. The ferrimagnetism is caused by the moment of $Ru^{4.5+}$ and $Mn^{3.5+}$ ions in frame of the mixed valence model.

Keywords: Compton profiles, ruthenium oxide compounds, manganese oxide compounds

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Development of magnetic Compton scattering using a 9T cryomagnet at the ESRF

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We report on the installation and use of high-field spin-polarised Compton scattering measurements at the European Synchrotron Radiation Facility (ESRF) in Grenoble, France. To achieve this, an Oxford Instruments "Spectromag" cryomagnet was purchased. This can provide magnetic fields up to 9 Tesla, at temperatures down to 1.3K, whereas previously the sample environment was limited to a maximum field of 1T, with temperatures down to 2.2K. The commissioning of this new facility was successful, and it will vastly increase the range of problems that can be addressed using the technique at the ESRF. There are technical aspects of conducting these experiments associated with the use of the new magnet. A suitable methodlogy has been devised, and the first measurements have been made. Results for the our recent research on the magnetocaloric material Gd_7Pd_3 and the metamagnetic system $Sr_3Ru_2O_7$ are presented in the poster.

Keywords: magnetic compton scattering, cryomagnet, spin density

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Magnetic Compton profile of $ErCo_2$ under high pressure

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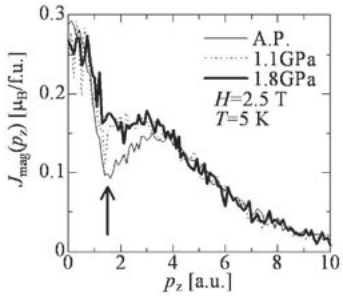
Magnetic phase transition of Laves phase $ErCo_2$ changes from first-order to second-order with increasing pressure [1], modification in the electronic state is of basic interest. We have recorded magnetic Compton profile (MCP) of $ErCo_2$ under high pressure up to 1.8 GPa using a diamond-anvil-cell and determined the spin-polarized momentum distribution quantitatively. The figure illustrates pressure variation of the normalized MCP. The dip indicated by the arrow gradually shallows with increasing pressure. Fitted profiles using the Hartree-Fock calculations reveal that the Co 3d spin moment decreases from 1.0 to 0.6 Bohr magnetons/atom and the Er 4f spin moment is reduced form 3.5 to 3.1 Bohr magnetons/atom. The suppression in the Co 3d moment is more significant in comparison with that of the Er 4f moment. This is consistent with the previous result of X-ray magnetic circular dichroism measurement [2]. Therefore, the instability of the Co 3d moment under pressure is closely associated with the magnetic phase transition.



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Keywords: high-pressure physics, Compton scattering, magnetic phase transitions

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Magnetic Compton scattering from ferromagnetic perovskite oxide $YTiO_3$

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$YTiO_3$ is one of the compounds which show orbital ordering phenomenon. The 3d electrons of Ti^{3+} ions in t2g configuration exhibit orbital ordering. Crystal structure of $YTiO_3$ is the perovskite (Pbnm). This compound is ferromagnetic below 28K, and is an insulator. The Magnetic Compton scattering (MCS) is one of the methods of observing the electronic structure. The physical quantity obtained from this experiment is Magnetic Compton Profile (MCP). The MCP is directly linked to the wave function of magnetic electrons in solids. The experiments were performed at the KEK-PF-AR-NE1A1. We measured the MCPs of $YTiO_3$ along the a- and c-axis. These two MCPs showed clearly directional anisotropy. We calculated the MCPs by using an atomic model wave function of a linear combination of two 3d-t2g orbitals, udyz+vdzx (u2+v2=1) for the four Ti sites. Calculation of the MCPs was performed for various values of coefficient u (0.63-0.89). The calculated MCP for the c-axis depends much stronger on the parameter u than the one for the a-axis. Fitting analysis using the MCP for the c-axis was performed, and the best fit was obtained for u = 0.84 and v = 0.54. MCP measurement for the b-axis has been made at the SPring-8 BL08W. The b-axis is the hard magnetization direction of this compound, and stronger magnetic field is needed for the MCP measurement of the b-axis than those of the a- and c-axis. The detailed analysis is being performed and the result will be given at the conference.

Keywords: magnetic compton scattering, orbital ordering, $YTiO_3$