Neutron scattering study on $CeRh_{0.1}Co_{0.9}In_5$

M. Suzuki[A], K. Kinjo[B], H. Kawano-Furukawa[A,C]

[A]*Ochanomizu University,* [B]*Tohoku Univ.,* [C]*RIEKN Institute*

The compounds expressed with $CeMIn_5$ (M = Co, Rh, Ir) are known as heavy fermion materials. Among them, $CeRhIn_5$ is recognized as a material that exhibits incommensurate antiferromagnetic ordering with a propagation vector along the *c*-axis, specifically (1/2, 1/2, 0.297), below T_N = 3.8 K. On the other hand, $CeCoIn_5$ transitions into a superconducting state below T_c= 2.3 K, and it was known that the superconducting transition is related to its magnetic features. To bare characteristics features and to understand the relationship between magnetism and superconductivity of this system, we have studied the mixed compound $CeRh_{(1-x)}Co_xIn_5$ by using neutron scattering techniques. It was previously reported by another group that the system exhibits magnetic order for x < 0.7, and there is no magnetically ordered phase above this concentration. However, our previous study on $CeRh_{0.2}Co_{0.8}In_5$ revealed that the system enters a new magnetic phase, prompting us to further investigate this region.

For the present study, we chose $CeRh_{0.1}Co_{0.9}In_5$ and attempted sample growth using the flux method, resulting in several high-quality single crystals suitable for experimental use. Neutron scattering experiments were conducted using the GPTAS triple-axis spectrometer at JRR-3, JAEA.

We found that there appears a very broad peak centered at around (0.5, 0.5, L = 0.6) attributed to this behavior is related to the nesting phenomenon with the system. However, there were no significant differences between the data at 3 K and 0.5 K, leaving the origin of the observed peak unclear. The results may provide valuable insights into the properties of these compounds, but further investigation is necessary to elucidate the nature of the observed peaks.

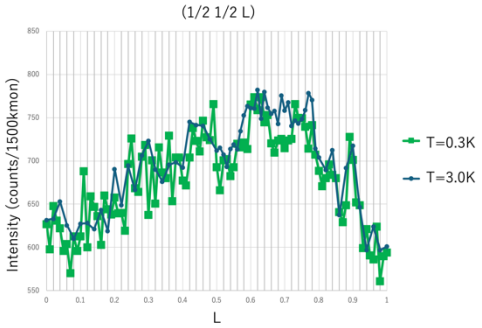

Fig. 1. Neutron diffraction profile observed along (1/2 1/2 L) at T=0.3 K (green) and 3.0 K(blue).