

Talk 22: 12:00–

High field ESR and magnetization measurements on one-dimensional Ising-like antiferromagnet $\text{BaCo}_2\text{V}_2\text{O}_8$

Shojiro Kimura

KYOKUGEN, Osaka University

$\text{BaCo}_2\text{V}_2\text{O}_8$ is a quasi one-dimensional (1D) Co^{2+} spin system, which crystallizes in the tetragonal $I41/acd$ space group. In this compound, edge-shared CoO_6 octahedra form a screw-chain structure along the c -axis. The chains are separated by non-magnetic V^{5+} and Ba^{2+} ion, resulting in 1D structural arrangement. The recent study by He *et al.* revealed that this compound shows a peculiar phenomenon in magnetic field, namely the field-induced order-disorder transition [1]. When the external magnetic field is applied to the c -axis, which is the easy axis of $\text{BaCo}_2\text{V}_2\text{O}_8$, the magnetization curve at 2 K exhibits a steep increase above $H_c \simeq 4$ T [1]. The heat capacity measurements showed that the magnetic ordering temperature is rapidly lowered by the external field for $H//c$ and no magnetic ordering is observed down to 1.8 K in the field region above H_c [1]. To gain deeper insights into the curious transition of $\text{BaCo}_2\text{V}_2\text{O}_8$, we have performed high field magnetization and ESR measurements on this compound in magnetic fields up to 50 T along the chain. The experimental results are explained well in terms of a one-dimensional $S = 1/2$ antiferromagnetic XXZ model in longitudinal fields. We show that the quantum phase transition from the Néel ordered phase to the spin liquid one in the model is responsible for a peculiar order to disorder transition in $\text{BaCo}_2\text{V}_2\text{O}_8$.

[1] Z. He Z, T. Taniyama, T. Kyomen and M. Itoh, Phys. Rev B **72**, 172403 (2005).