

EINLADUNG zum IFP-SEMINAR

Magnetic phase diagram of an orthorhombic Kagomé cobaltite $\text{CaBaCo}_4\text{O}_7$

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Host: David Szaller
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Abstract:

Magnetic frustration often plays an important role in multiferroic properties as is exemplified by the electric polarization induced by the spiral magnetic order. $\text{CaBaCo}_4\text{O}_7$ is a multiferroic material hosting magnetic frustration[1] exhibiting the largest electric polarization change about 17 mC/m^2 at the ferrimagnetic transition so far among all the multiferroic materials[2]. $\text{CaBaCo}_4\text{O}_7$ belongs to the space group $Pbn2_1$. Magnetic Co ions form Kagomé- and triangular- lattice layers, which alternately stack along the c -axis.

$\text{CaBaCo}_4\text{O}_7$ shows a ferrimagnetic transition at $T_c \sim 60 \text{ K}$ at zero magnetic field. The specific heat and the electric permittivity of single crystal $\text{CaBaCo}_4\text{O}_7$ exhibits another anomaly at $T^* \sim 69 \text{ K}$ slightly higher than T_c in zero magnetic field, while the origin of the anomaly was not clarified[2]. We have measured the magnetization and elastic constants in detail, our present result reveals that paramagnetic-antiferromagnetic transition occurs at T^* . Furthermore, we propose a magnetic phase diagram of $\text{CaBaCo}_4\text{O}_7$ (Fig. 1) in the B - T plane based on the measurement of elastic constants $C_{11}; C_{55}; C_{66}$. The transition magnetic field was determined by a measurement of the magnetization of detwinned sample.

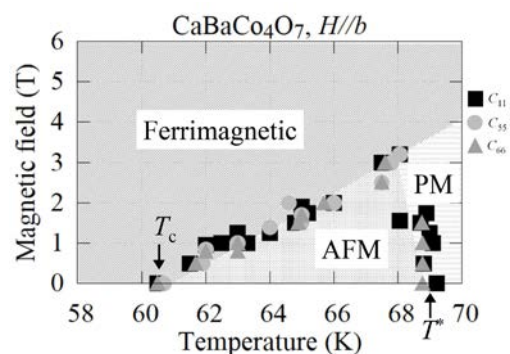


Fig. 1 Figure 1: Magnetic phase diagram of $\text{CaBaCo}_4\text{O}_7$ for the magnetic field parallel to the b axis.

[1] Zhe Qu, Langsheng Ling, Lei Zhang, Li Pi, Yuheng Zhang, Solid State Commun. **151**, 917-919 (2011).

[2] V. Caignaert, A. Maignan, K. Singh, Ch. Simon, V. Pralong, B. Raveau, J. F. Mitchell, H. Zheng, A. Huq, and L. C. Chapon, Phys. Rev. B **88**, 174403 (2013).