

## Low Temperature Magnetism in the Metallic Pyrochlore $\text{Pr}_2\text{Ir}_2\text{O}_7$

K. Kimura, Y. Ohta, Y. Machida, S. Takajo, K. Matsubayashi, Y. Uwatoko, Y. Shimura, T. Sakakibara, and S. Nakatsuji

Institute for Solid State Physics, University of Tokyo, Kashiwa, Chiba 277-8581, Japan

The pyrochlore  $\text{Pr}_2\text{Ir}_2\text{O}_7$  is a rare example of metallic geometrically-frustrated Kondo lattice providing a unique opportunity to investigate the correlation between frustrated magnetism and mobile electrons.<sup>1,2,3</sup> In previous single crystal studies, a spontaneous Hall effect in the absence of uniform magnetization has been observed in the spin-liquid region  $T < 1.5$  K,<sup>3</sup> which suggests that  $\text{Pr}_2\text{Ir}_2\text{O}_7$  is the first material forming a chiral spin liquid phase where time reversal symmetry is macroscopically broken without magnetic dipole order. Here we have investigated low temperature magnetism in newly-synthesized polycrystalline samples of  $\text{Pr}_2\text{Ir}_2\text{O}_7$ . The temperature dependence of magnetic susceptibility in a low field (0.1 T) shows a strong decrease below  $T_0 = 0.8$  K, indicating some form of a phase transition. The temperature dependence of the specific heat in a zero field also shows a peak at  $T_0$ , ensuring the bulk nature of the transition. These results are in sharp contrast to the spin-liquid behavior in single crystals and polycrystalline samples made by other methods. In the presentation, we will report detailed results and discuss the origin of the ordered phase.

<sup>1</sup>S. Nakatsuji *et al.*, Phys. Rev. Lett. **96**, 087204 (2006).

<sup>2</sup>Y. Machida *et al.*, Phys. Rev. Lett. **98**, 057203 (2007).

<sup>3</sup>Y. Machida *et al.*, Nature **463**, 210 (2010).