

Abstract Submitted  
for the SES12 Meeting of  
The American Physical Society

**Field-induced spin-flop transitions in single-crystalline  $\text{La}_{0.25}\text{Pr}_{0.75}\text{Co}_2\text{P}_2$**  TONGSHUAI XU, Department of Physics, Florida State University, Tallahassee, FL; School of Physics, Shandong University, Jinan, P.R.China, KIRILL KOVNIR, PING CHAI, MICHAEL SHATRUK, Department of Chemistry and Biochemistry, Florida State University, Tallahassee, FL, PENG XIONG, Department of Physics, Florida State University, Tallahassee, FL — We report measurements of anisotropic magnetization and magnetoresistance (MR) on single crystals of  $\text{La}_{0.25}\text{Pr}_{0.75}\text{Co}_2\text{P}_2$ , a novel magnetic alloy with the  $\text{ThCr}_2\text{Si}_2$ -type structure, which is a parent structure of the ferro-pnictide high-temperature superconductors. The material exhibits two magnetic transitions in the  $c$ -axis direction at 240 K and 10.5 K. Below 10K, the magnetization and MR measurements provide corroborating evidence that applying a magnetic field along the  $c$ -axis induces two successive spin-flop transitions at 0.5 T and 5.5 T. For a magnetic field applied in the  $ab$  plane, spins cannot be fully polarized at up to 7 T and the MR changes sign from negative to positive at  $\sim 20$  K with increasing temperature. The observations are consistent with a magnetic configuration, in which the Pr and Co magnetic moments are oriented along the  $c$  axis and ordered ferromagnetically within the  $ab$  plane but antiferromagnetically along the  $c$  axis. Details of the microscopic origin of the spin-flop transitions will be discussed.

Tongshuai Xu  
Department of Physics, Florida State University, Tallahassee, FL;  
School of Physics, Shandong University, Jinan, P.R.China

Date submitted: 19 Sep 2012

Electronic form version 1.4