

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Doping dependent vortex pinning in single crystal  $\text{BaFe}_2(\text{As}_{1-x}\text{P}_x)_2$**  LEI FANG, Y. JIA, Argonne National Laboratory, Argonne, IL 60439, USA, C. CHAPARRO, Argonne National Laboratory and Department of Physics, University of Notre Dame, J. SCHLUETER, Argonne National Laboratory, Argonne, IL 60439, USA, Z.L. XIAO, Argonne National Laboratory and Northern Illinois University, H. HELMUT, A.E. KOSHELEV, U. WELP, G.W. CRABTREE, W.K. KWOK, Argonne National Laboratory, Argonne, IL 60439, USA — We report on magnetization measurements on doped single crystals of superconducting  $\text{BaFe}_2(\text{As}_{1-x}\text{P}_x)_2$ . For optimum doped crystals, we observe a second magnetization peak effect (fish tail). With further doping of phosphur for arsenic, the fish tail effect evolves into a peak effect close to  $H_{c2}$ , similar to that found in conventional type II superconductors. In heavily overdoped crystals, the magnetization loop is mostly reversible and no peak effect is observed. The evolution of the peak effect with doping is attributed to the reduction in defects as the crystal's purity is increased, going from optimum doping to over-doping. Possible pinning mechanism for the peak effect will be discussed within the framework of recent heat capacity and resistivity measurements.

Lei Fang  
Argonne National Laboratory, Argonne, IL 60439, USA

Date submitted: 20 Dec 2010

Electronic form version 1.4