

Abstract Submitted  
for the MAR09 Meeting of  
The American Physical Society

**Effect of ferromagnetism on unconventional superconductivity in the  $\text{Pr}_{1-x}\text{Nd}_x\text{Os}_4\text{Sb}_{12}$  system** P.-C. HO, Physics/CSU-Fresno, M. B. MAPLE, T. YANAGISAWA<sup>1</sup>, W. M. YUHASZ, N. P. BUTCH, A. A. DOORAGHI, C. C. ROBINSON, Physics/UCSD — The filled skutterudite compound  $\text{PrOs}_4\text{Sb}_{12}$  is a 1.85 K heavy fermion superconductor (SC), which displays unconventional SC property, such as existence of multiple SC phases and point nodes in the SC energy gap and the appearance of internal magnetic field in its SC state.  $\text{NdOs}_4\text{Sb}_{12}$  is a mean-field type magnet with a low Curie temperature  $\sim 1$  K. The Nd substitution in the  $\text{Pr}_{1-x}\text{Nd}_x\text{Os}_4\text{Sb}_{12}$  has been carried out in order to investigate the ferromagnetic (FM) effect on the unconventional SC of  $\text{PrOs}_4\text{Sb}_{12}$  and the quantum critical behavior in this system. SC state in this system disappears near  $x \sim 0.55$  and FM extends into the SC region. The  $x$  dependence of the 0-K extrapolated upper critical field  $H_{c2}(x, T = 0)$  has curvature breaking at  $x \sim 0.3$ . The  $H_{c2}(x, T = 0)$  data can be analyzed by multiple pair breaking effect due to magnetic field, appearance of impurity, and the exchange field generated by magnetic ions. However, when  $H_{c2}(x, T = 0)$  of  $\text{Pr}_{1-x}\text{Nd}_x\text{Os}_4\text{Sb}_{12}$  is compared to that of a BCS SC  $\text{La}_{3-x}\text{Gd}_x\text{In}$ , the curvature in the regime where  $x/x_{cr} < 0.5$  is significantly different. Detail analysis and comparison will be discussed. Research at CSU-Fresno supported by RC CCSA #7669 and Fresno State start-up fund; at UCSD by US DOE and NSF; at Hokkaido U by MEXT, Japan.

<sup>1</sup>currently at Hokkaido U, Japan

Pei-Chun Ho  
Physics/CSU-Fresno

Date submitted: 21 Nov 2008

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