

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Re-entrant Resistance and Transport Anomalies in P-doped Eu Pnictide: $\text{EuFe}_2(\text{As}_{0.7}\text{P}_{0.3})_2$, with coexisting superconducting and ferromagnetic phases¹ NICHOLAS CORNELL, Nanotech Institute, University of Texas at Dallas, TIAN SHENG, HUIQIU YUAN, GUANGHAN CAO, SHENGGAO XU, ZHU'AN XU, Department of Physics, Zhejiang University, AUSTIN HOWARD, NATHANAEL MAYO, MYRON SALAMON, ANVAR ZAKHIDOV, Nanotech Institute, University of Texas at Dallas — The doping of Eu 122 pnictides by Phosphorus has been shown to result in superconductivity which coexists with ferromagnetism of spins ordered in Eu sites. Recently, in the course of exploring Fe-based superconductors, we observed both SC associated with Fe-3d electrons and ferromagnetism due to the long-range ordering of Eu-4f moments in $\text{EuFe}_2(\text{As}_{0.7}\text{P}_{0.3})_2$ and in similar compound with lower P-doping, at 0.27 the $R(T)$ peak appears at $T \sim 19$ K [1]. This $R(T)$ peak is associated with suppression of superconductivity by ferromagnetism and a re-entrance of resistance at low temperature. This presentation further investigates the pnictides at different P doping levels with transport measurements, correlated with magnetic and ESR data. Pnictides were made with a Solid state reaction method including the flux method to grow the single crystals. The dependence of the transition temperature and the behavior of the re-entrant $R(T)$ peak at 18-19 K on magnetic field and amount of dopant are addressed. [1]Aamir Ahmed, M. Itou, Shenggao Xu, Zhu'an Xu, Guanghan Cao, Y. Sakurai, James Penner-Hahn, Aniruddha Deb, Phys. Rev. Letters 105, 207003 (2010)

¹AFOSR grant FA 9550-09-10384

Nicholas Cornell
Nanotech Institute, University of Texas at Dallas

Date submitted: 11 Nov 2011

Electronic form version 1.4