Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Non-Fermi liquid behavior and the undersceened Kondo effect in $Fe_{1-y}Co_ySi$ YAN WU, Department of Physics and Astronomy, Louisiana State University, Baton Rouge, 70803, BRAD FULFER, Department of Chemistry, Louisiana State University, Baton Rouge, 70803, JULIA CHAN, Department of Chemistry, The University of Texas at Dallas, Richardson, 75080, DAVID YOUNG, JOHN DITUSA, Department of Physics and Astronomy, Louisiana State University, Baton Rouge, 70803 — Mn or Co substitutions into the narrow band-gap insulator FeSi introduce charge carriers, either holes or electrons, accompanied by an equal density of more localized magnetic moments resulting in an interesting insulator-to-metal transition (IMT). Mn doping of FeSi exhibits an IMT where the nascent metal displays intriguing field sensitive non-Fermi-Liquid (NFL) behavior due to the undercompensation of S =1 impurity moments by the spin-1/2 hole carriers. Here, we present the results of an investigation of $Fe_{1-y}Co_ySi$ ($0 \leq y \leq 0.1$). Our magnetization and susceptibility measurements indicate that for $y<0.03$ Co-impurities alsointroduce a S =1 magnetic moment that have a tendency to form singlets whereas for larger ya ferromagnetic interaction that grows with y. We have discovered a NFLbehavior for $y<0.03$ that evolves into the standard disordered Fermi-liquid form either by applying a magnetic field or by increasing y. The results of specific heat measurements on $Fe_{1-y}Co_ySi$,performed to explore the underlying underscreened Kondo mechanism, to investigate its variation with field and composition,and to compare with our $Fe_{1-x}Mn_xSi$ data will be presented.

Yan Wu
Louisiana State Univ - Baton Rouge

Date submitted: 14 Nov 2014 Electronic form version 1.4