Abstract Submitted
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Magnetic properties of $\mathbf{Fe_{1-y}Co_ySi}$ near insulator-metal transition[1] YAN WU, Department of Physics and Astronomy, Louisiana State University, Baton Rouge, LA 70803, BRADFORD FULFER, JULIA CHAN, Department of Chemistry, Louisiana State University, Baton Rouge, LA 70803, DAVID YOUNG, JOHN DITUSA, Department of Physics and Astronomy, Louisiana State University, Baton Rouge, LA 70803 — FeSi is a nonmagnetic narrow gap insulator with interesting temperature-dependent magnetic and optical properties. When doped with Mn, holes are introduced to the FeSi system along with S=1 magnetic moments. As a result, a non-Fermi liquid metallic state is observed due to the underscreening of the S=1 moments. Here we investigate the effects of Co doping of FeSi ($Fe_{1-y}Co_ySi$, $0 \leq y \leq 0.03$) to explore the insulator-to-metal transition and to compare with Mn-doped effects. We find a systematic increase of the Curie constant and Weiss temperature of the impurity-induced low temperature susceptibility with y. The Curie constant and saturated magnetization indicates that there is an underlying competition between screening of the magnetic moments at low y and ferromagnetic ordering at higher Co-concentrations. Transport measurements are underway to explore the associated charge carrier properties in this semiconducting system on the verge of ferromagnetism.

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