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Exploring $Fe_{1-y}Co_xSi$ near the insulator-to-metal transition YAN WU, Department of Physics and Astronomy, Louisiana State University, BRAD FULFER, JULIA CHAN, Department of Chemistry, Louisiana State University, DAVID YOUNG, JOHN DITUSA, Department of Physics and Astronomy, Louisiana State University — FeSi is a nonmagnetic narrow gap insulator with interesting temperature-dependent magnetic and optical properties. Doping FeSi with Mn or Co introduces hole or electron a charge carriers as well as additional magnetic moments. Our previous investigations show that for Mn doping near the insulator-metal-transition(IMT) an intriguing field sensitive non-Fermi-Liquid behavior results from the underscreening of the $S = 1$ impurity moments. Here we explore the case of electron doping via Co substitution for concentrations very near the IMT. Our magnetic susceptibility measurements indicate an underlying competition between screening of the magnetic moments at low y and ferromagnetic ordering at higher Co-concentrations. Our carrier transport measurements indicate that the IMT occurs near $y = 0.01$ and that above 2 K electron-electron interaction effects dominate the magnetoresistance. However, for $T < 1$ K, high magnetic fields induce an enhance charge carrier mobility for samples with $y \sim 0.01$. We will present data comparing the magnetotransport of the Co and Mn doped samples in order to compare electron and hole doping in proximity to the IMT.

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