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Exploring $Fe_{1-y}Co_ySi$ 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. Charge carriers, either holes or electrons, accompanied by a more localized magnetic moments, can be introduced by doping FeSi with Mn or Co. It has been reported that Mn doping of FeSi near the insulator-to-metal transition (IMT) exhibits an intriguing field sensitive non-Fermi-Liquid behavior due to an undercompensated Kondo effect where the spin-1/2 carriers underscreen the S =1 impurity moments. To compare with the case of Mn substitution (hole doping), we investigate the effect of Co substitution ($Fe_{1-y}Co_ySi$, $0 \leq y \leq 0.1$)(electron doping)results. Our magnetic property measurements indicate an interesting evolution of the impurity magnetic moments with y. Our transport studies indicate a temperature and field dependence that does not conform to the standard disordered Fermi-liquid form for small y. Standard semiconducting behavior is restored either by applying a magnetic field or increasing y. A more detailed analysis is underway to compare with disordered Fermi liquid theory as well as to the previously reported behavior of $Fe_{1-x}Mn_xSi$.

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