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Penetration Depth Studies of Tin Doped $CeCoIn_5$ DANIEL VANDERVELDE, University of Illinois Urbana-Champaign, H.Q. YUAN, University of Illinois Urbana-Champaign, M.B. SALAMON, University of Illinois Urbana-Champaign, E.D. BAUER, LANL, N. HUR, LANL, F. RONNING, LANL, M.J. GRAF, LANL, J.D. THOMPSON, LANL, J.L. SARRAO, LANL, R. MOVSHOVICH, LANL — The heavy fermion superconductor $CeCoIn_5$ has attracted much attention recently. Its high T_C ($\sim$2.3K), nearby antiferromagnetic phases, and evidence of line nodes in the superconducting gap indicative of a d-wave order parameter have made it an interesting topic of study. Here we present measurements of the AC magnetic field penetration depth ($\Delta\lambda$(T)) undertaken on the same material, but with an impurity doping of Sn ($CeCoIn_{5-X}Sn_X$) at three concentrations x=0.03, x=0.06, and x=0.09. Our findings support the assertion that $CeCoIn_5$ is a nonlocal, d-wave superconductor, but that as impurity concentration is increased, scattering quickly becomes the dominant mechanism. All data was modeled as a quadratic, scattering-dominated temperature dependence that crosses over to a linear regime reminiscent of the pure sample at a temperature[1]T*. The observed value of T* increases with the concentration of impurities as is predicted in the impurity model by Hirschfield and Goldenfeld ($T^* \sim \sqrt{n_i}$).[1] This dependence on the concentration of a nonmagnetic impurity adds further confirmation of the d-wave nature of the superconducting state. [1] P.J. Hirschfield and N. Goldenfeld, Phys Rev. B **48**, 4219 (1993)

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