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From itinerant ferromagnetism to insulating antiferromagnetism: A magnetic and transport study of single crystal $SrRu_{1-x}Mn_xO_3$ ($0 \leq x < 0.60$) SHALINEE CHIKARA, X.N. LIN, E. ELHAMI, V. DURAIRAJ, G. CAO, Department of Physics and Astronomy, University of Kentucky, Lexington, KY-40506, USA, PEDRO SCHLOTTMANN, National High Magnetic Field Laboratory and Florida State University, Tallahassee, FL-32306, USA — We report results of a magnetic and transport study of $SrRu_{1-x}Mn_xO_3$ ($0 \leq x < 0.60$), i.e., Mn doped $SrRuO_3$. The Mn doping drives the system from the itinerant ferromagnetic state (T_C=165 K for x=0) through a quantum critical point at x_c=0.39 to an insulating antiferromagnetic state. The onset of antiferromagnetism is abrupt with a Nel temperature increasing from 205 K for x=0.44 to 250 K for x=0.59. Accompanying this quantum phase transition is a drastic change in resistivity by as much as 8 orders of magnitude as a function of x at low temperatures. The critical composition x_c=0.39 sharply separates the two distinct ground states, namely the ferromagnetic metal from the antiferromagnetic insulator.

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