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Magnetic Superstructure and Metal-Insulator Transition in Mn-Substituted $Sr_3Ru_2O_7$ M.A. HOSSAIN, Univ. of B.C. and SIMES, SLAC, Stanford University, B. BOHNENBUCK, MPI, Stuttgart, Y.-D. CHUANG, ALS, Lawrence Berkeley National Laboratory, J. GECK, Univ. of British Columbia, Y. TOKURA, University of Tokyo, Y. YOSHIDA, AIST, Japan, Z. HUSSAIN, ALS, Lawrence Berkeley National Laboratory, B. KEIMER, MPI, Stuttgart, G.A. SAWATZKY, A. DAMASCELLI, Univ. of British Columbia — We present a temperature-dependent resonant elastic soft x-ray scattering (REXS) study of the metal-insulator transition in $Sr_3(Ru_{1-x}Mn_x)_2O_7$, performed at both Ru and Mn L-edges. Resonant magnetic superstructure reflections, which indicate an incipient instability of the parent compound, are detected below the transition. Based on modelling of the REXS intensity from randomly distributed Mn impurities, we establish the inhomogeneous nature of the metal-insulator transition, with an effective percolation threshold corresponding to an anomalously low $x \sim 0.05$ Mn substitution. In collaboration with A.G. Cruz Gonzalez, J.D. Denlinger (Berkeley Lab), I. Zegkinoglou, M.W. Haverkort (MPI, Stuttgart), I.S. Elfimov, D.G. Hawthorn (UBC), R. Mathieu, S. Satow, H. Takagi (Tokyo), H.-H. Wu and C. Schüßler-Langeheine (Cologne).

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