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**Resonant soft x-ray scattering from $La_{1-x}Sr_xMnO_3$ quantum wire arrays** SHUAI WANG, SERBAN SMADICI, JAMES LEE, MICHAEL ODLYZKO, XIAOFANG ZHAI, JAMES ECKSTEIN, AMISH SHAH, JIAN-MIN ZUO, PETER ABBAMONTE, Frederick Seitz Materials Research Laboratory, University of Illinois, ANAND BHATTACHARYA, Argonne National Laboratory — Any finite sized, patterned system with an energy gap is expected to have elementary excitations that are characteristic of its boundary. To test this idea we have fabricated large arrays ($>$ 60000 elements) of colossal magnetoresistance- phase $La_{2/3}Sr_{1/3}MnO_3$ quantum wires. These wires are 80 nm in width so have properties that are dominated by edge effects. We used resonant soft x-ray scattering (RSXS) and SQUID magnetometry to study their magnetic properties. We found that patterning lowers the Curie temperature and suppresses the degree of magnetization. RSXS studies show diffraction maxima from the wire period, as well as temperature-dependent diffuse scattering. We will discuss these results in the context of combined structural and magnetic disorder. Funding #: DOE grants DE-FG02-07ER46453 and DE-FG02-06ER46285

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