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Observing Metal-Insulator Transitions in Spatially-Confined Perovskite Manganite Thin Films[1] T. ZAC WARD, Oak Ridge National Laboratory and The University of Tennessee, H.Y. ZHAI, J.X. MA, Oak Ridge National Laboratory, KENJI FUCHIGAMI, E.WARD PLUMMER, JIAN SHEN, Oak Ridge National Laboratory and The University of Tennessee — Transition metal oxides (TMO) exhibit a strong spin-charge-lattice interaction that can lead to electronic phase separation (PS). This phenomenon carries a number of fascinating electronic and magnetic phases while maintaining a single crystalline structure. To better understand the nature of phase transition involving the coexistence of multiple phases, we have fabricated $La_{5/8-x}Pr_xCa_{3/8}MnO_3$ (LPCMO) wires from single crystal LPCMO thin films using optical and E-beam lithographic techniques. These wires display giant and ultrasharp steps with varying temperature and magnetic field near the metal-insulator transition, which is believed to be a direct consequence of the influence of spatial confinement on percolative transport in these structures.

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T.Z. Ward
Oak Ridge National Laboratory and The University of Tennessee

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