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Oxygen Vacancy Induced Metal Insulator Transition in Epitaxial $\text{Pr}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$ Thin Films$^1$ JINGDI ZHANG, KE-BIN FAN, Boston University, RYUHEI KINJO, WEIMING XU, IWAO KAWAYAMA, MASAYOSHI TONOUCHI, Osaka University, XIN ZHANG, RICHARD AVERITT, Boston University — We report the metal-insulator transition in epitaxial $\text{Pr}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$ thin film by introducing oxygen vacancies, which assist the nucleation of ferromagnetic metallic domains in an antiferromagnetic insulating matrix. The hysteresis of the resistivity indicates the transition is first-order, and covers a broad temperature range from 80K to 220K. Such novel transport properties of the x=0.3 doped manganite may result from strong spin-lattice coupling which stabilizes the system to a metallic metastable state at low temperature.

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