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**Size effect in percolative phase separation of colossal magnetoresistive (La,Pr,Ca)$MnO_3$ films .** HONG-YING ZHAI, Oak Ridge National Laboratory, JIANXING MA, DANE GILLASPIE, THOMAS WARD, Oak Ridge National Laboratory and University of Tennessee, ANTHONY HMELO, Vanderbilt University, LEONARD FELDMAN, Vanderbilt University, JIAN SHEN, Oak Ridge National Laboratory and University of Tennessee — $La_{1-x-y}Pr_yCa_xMnO_3$(LPCMO) (where x=3/8) is electronically phase-separated into a sub-micrometre-scale mixture of ferromagnetic metallic (FMM) and charge-ordered insulating (COI) domains. Transport through the ferromagnetic network depends sensitively on the domain structure, which can be controlled by magnetic field, light, and strain, etc. Enhanced CMR effect can be achieved in the vicinity of the percolative threshold. Using optical lithography, e-beam lithography, and focused ion beam techniques, we can fabricate series micron and sub-micron structures on LPCMO films grown on $LaAlO_3$ and $SrTiO_3$ using pulsed laser deposition. Size dependant transport properties will be addressed in detail. Research sponsored by the U.S. Department of Energy under contract DE-AC05-00OR22725 with Oak Ridge National Laboratory.

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