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Inhomogeneity driven giant magneto-resistance in compressed LaMnO3 MARIA BALDINI, HPSynC, Carnegie Inst of Washington, TAKAKI MURAMATSU, Carnegie Inst of Washington, MOHAMMAD SHERAFATI, Department of Physics, University of Missouri, HO-KWANG MAO, Carnegie Inst of Washington, LORENZO MALAVASI, Department of Chemistry and INSTM, University of Pavia, PAOLO POSTORINO, Department of Physics, University of Rome "Sapienza", SASHI SATPATHY, Department of Physics, University of Missouri, VIKTOR STRUZHKIN, Carnegie Inst of Washington — CMR in rare-earth manganites has been intensively studied over the past decades. However, the mechanism underlying the CMR is still not completely clarified. Up to now, CMR was only observed in doped manganites suggesting that the presence of mixed valence Mn ions is an essential ingredient of the CMR phenomenon. Since its discovery, phase separation has been strongly linked to CMR, although the exact mechanism was not established yet [1-5]. We performed high pressure transport measurement varying temperature and magnetic field in a pure compound LaMnO3, and observe CMR at around 32 GPa. This result leaves aside many ambiguities inherent to compounds with complex chemical composition. We used pressure to modify the material's property and to clarify in a clean way the role played by phase separation. We found that pressure induces the formation of a mixed phase which consists of two components: an insulating one with Jahn Teller distortion and a metallic one without distortion. The volume fraction of the metallic phase grows with pressure and the CMR is observed just below the percolation threshold. The experimental results are well reproduced by theoretical calculations and percolation theory.

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