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Properties of Doped Manganese Oxides and the Origin of Colossal Magnetoresistance I. FELNER, I. NOWIK, D. ORGAD, M. I. TSINDLEKHT, Hebrew Univ, Israel, A. FRYDMAN, D. I. GOLOSOV, N. OSSI, Bar-Ilan Univ, Israel, Y. M. MUKOVSKII, Moscow State Steel and Alloys Inst, Russia — We report a series of magnetic and transport measurments on high-quality single crystal manganate samples in the colossal magnetoresistive (CMR) regime. A small iron doping allows also for a Mössbauer spectroscopy study, showing both an unusual line broadening within the ferromagnetic phase and a coexistence of ferro- and paramagnetic contributions in the critical region. The resistivity peak (which gives rise to the CMR) occurs at a somewhat higher temperature, suggesting that it *does not* correspond to a threshhold of percolation between metallic (ferromagnetic) and insulating (paramagnetic) phases. In addition, our magnetic and transport data appear to imply that the paramagnetic-ferromagnetic (Curie) transition and the metal-insulator transition (the resistivity maximum) are two distinct phenomena on their own right, with distinct (although probably interrelated) physical origins. We speculate that these results can be understood phenomenologically within the framework of a two-fluid model.

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