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Competing-fluctuation-induced anomalous magnetocaloric effects in perovskite manganites HIDEAKI SAKAI, YASUJIRO TAGUCHI, YOSHINORI TOKURA[1], Cross-Correlated Materials Research Group, RIKEN — A magnetocaloric (MC) effect refers to the isothermal entropy change induced by applying (or removing) a magnetic field to the materials, which is a performance index of the magnetic refrigeration technology. In this study, the variation of MC effects has been systematically investigated for colossal magnetoresistive manganites $R_{0.6}Sr_{0.4}MnO_3$ (R=La-Gd) by controlling the R-dependent one-electron bandwidth. With decreasing the bandwidth, the temperature profile of entropy change exhibits a larger peak at the ferromagnetic transition temperature and a steeper drop below it, due to the first-order nature of the transition promoted by a competing charge-orbital ordering instability. For the smallest-bandwidth systems adjacent to the metal- insulator phase boundary, a rectangular-shaped profile for the entropy change emerges with an anomalously wide temperature range. Model calculations have indicated that the bicritical fluctuation enhanced in the phase-competing region has a strong impact on such MC features [1].
[1] H. Sakai *et al.*, J. Phys. Soc. Jpn. **78**, 113708 (2009).

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