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Stabilization of Charge Ordering by Magnetic Exchange[1]

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The magnetic exchange energies in charge ordered $La_{1/3}Sr_{2/3}FeO_3$ (LSFO) and its parent compound $LaFeO_3$ (LFO) have been determined by inelastic neutron scattering. In LSFO, the measured ratio of ferromagnetic exchange between Fe^{3+}-Fe^{5+} pairs (J_F) and antiferromagnetic exchange between Fe^{3+}-Fe^{3+} pairs (J_{AF}) fulfills the criterion for charge ordering driven by magnetic interactions ($J_F/J_{AF} > 1$). The 30% reduction of J_{AF} as compared to LFO indicates that doped holes are delocalized, and charge ordering occurs without a dominant influence from Coulomb interactions.

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