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**Tunneling Evidence of Half Metallicity in Epitaxial
Films of Ferromagnetic Perovskite Manganites and Ferrimagnetic
Magnetite**¹ NAI-CHANG YEH, JOHN Y.T. WEI, *Department of Physics, California Institute of Technology*, RICHARD P.

VASQUEZ, *Jet Propulsion Laboratory, California Institute of Technology*, ARUNAVA GUPTA, *IBM T.J. Watson Research Center*. -- Direct evidence of half-metallic density of states (DOS) is observed by scanning tunneling spectroscopy on ferromagnetic $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$ and $\text{La}_{1-x}\text{Sr}_x\text{MnO}_3$ ($x=0.3, 0.33$) epitaxial films which exhibit colossal magnetoresistance (CMR). At 77K, well below the Curie temperatures, the normalized tunneling conductance $(dI/dV)/\langle I/V \rangle$ for all samples exhibits similar pronounced peak structures, consistent with spin-splitting of the itinerant bands in the ferromagnetic state. The exchange energy splitting of the majority and minority spins, and the energy gap in the minority bands, show variations with chemical composition and temperature. For comparison, the half-metallic ferrimagnet Fe_3O_4 is also studied, showing the characteristic spin-split DOS, and the spectral similarities and differences with the perovskite manganites are discussed.

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² J.Y.T. Wei *et al.*, Phys. Rev. Lett., in press (1997).

³ J.Y.T. Wei *et al.*, Appl. Phys. Lett., in press (1998).

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