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A minimal tight-binding model for ferromagnetic canted bilayer manganites CHRISTOPHER LANE, Northeastern Univ, M. BAUBLITZ, Boston U., H. LIN, NUS, H. HAFIZ, R.S. MARKIEWICZ, B. BARBIELLINI, Northeastern U., Z. SUN, D.S. DESSAU, UC Boulder, A. BANSIL, Northeastern U. — Half-metallicity in materials has been a subject of extensive research due to its potential for applications in spintronics. Ferromagnetic manganites have been seen as a good candidate, and aside from a small minority-spin pocket observed in $La_{2-2x}Sr_{1+2x}Mn_2O_7$ ($x = 0.38$), transport measurements show that ferromagnetic manganites essentially behave like half metals. Here we develop robust tight-binding models to describe the electronic band structure of the majority as well as minority spin states of ferromagnetic, spin-canted antiferromagnetic, and fully antiferromagnetic bilayer manganites. Both the bilayer coupling between the MnO_2 planes and the mixing of the $|x^2 - y^2>$ and $|3z^2 - r^2>$ Mn 3d orbitals play an important role in the subtle behavior of the bilayer splitting. Effects of k_z dispersion are included.

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