Electronic Mechanism for the Coexistence of Ferroelectricity and Ferromagnetism

JAMES GUBERNATIS, CRISTIAN BATISTA, Los Alamos National Laboratory, WEI-GUO YIN, Brookhaven National Laboratory — We study the strong coupling limit of a two-band Hubbard Hamiltonian that also includes an inter-orbital on-site repulsive interaction $U_{ab}$. When the two bands have opposite parity and are quarter filled, we prove that the ground state is simultaneously ferromagnetic and ferroelectric for infinite intra-orbital Coulomb interactions $U_{aa}$ and $U_{bb}$. We also show that this coexistence leads to a singular magnetoelectric effect.

\textsuperscript{1}Work supported by the Department of Energy

James Gubernatis
Los Alamos National Laboratory

Date submitted: 12 Jan 2006

Electronic form version 1.4