Abstract Submitted
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Multi-orbital Mott Transition and High T_c Ferromagnetism in Strongly Correlated Oxides[1] MOHIT RANDERIA, ONUR ERTEN, O. NGANBA MEETEI, NANDINI TRIVEDI, PATRICK WOODWARD, The Ohio State Universitry — Amongst all perovskites with a net magnetic moment, Sr_2CrOsO_6 (SCOO) [1] has the highest $T_c = 725$K. We model this as a multi-orbital Hubbard model with different Coulomb U's and Hund's coupling J_H's on the Cr and Os sites along with spin-orbit coupling (SOC) λ_{so} on Os. Using a slave-rotor approach, we find a new Mott criterion [2] $\left(\tilde{U}_{\rm Cr}\tilde{U}_{\rm Os}\right)^{1/2} > 2.5W$, where W is the bandwidth and $\tilde{U}$'s are the effective charge gaps including the effects of U, J_H and λ_{so}. Using this result, we argue that SCCO is a Mott insulator. Next, we show that the orbital moment on Os is quenched. The effective spin Hamiltonian for $S = 3/2$ moments has Cr-Os and Os-Os antiferromagnetic superexchange interactions that are frustrated. Using a variational approach and Monte Carlo simulations, we show that the system has a canted ground state with a net moment at $T = 0$, a non-monotonic magnetization $M(T)$ and a high T_c. Our results [2] are in excellent agreement with available data [1] and we predict the magnetic $S(\mathbf{q})$ that will test our theory. [1] Y. Krockenberger *et al.*, Phys Rev. B **75** 020404 (2007). [2] O. N. Meetei, O. Erten, M. Randeria, N. Trivedi, and P. Woodward, arXiv:1205.1811

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