

Monte Carlo Study of $(\text{LMO})_{2n}/(\text{SMO})_n$ Superlattices ($n = 1-4$)

Shuai Dong, Rong Yu, Seiji Yunoki, and Elbio Dagotto

*Department of Physics and Astronomy, University of Tennessee,
Materials Science and Technology Division, ORNL*

We performed a Monte Carlo study on the two-orbital double-exchange model for $(\text{LaMnO}_3)_{2n}/(\text{SrMnO}_3)_n$ superlattices. Here the LaMnO_3 thin film is a ferromagnetic insulator instead of an A-type antiferromagnetic insulator in its bulk forms [1,2]. For the $n = 1$ case, not only the charge density but also the spin order are quite uniform, which is similar to the behavior of $\text{La}_{2/3}\text{Sr}_{1/3}\text{MnO}_3$. With increasing n , the density of states at the Fermi level decreases leading to a pseudogap when $n > 3$, which agrees with the metal-to-insulator transition in the experiments [1].

References:

- [1] A. Bhattacharya *et al.*, cond-mat/0710.1452.
- [2] A. Bhattacharya *et al.*, Appl. Phys. Lett. **90**, 222503 (2007).