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Exploring interfacial ferromagnetism in manganite-based superlattices DI YI, CHARLES FLINT, YURI SUZUKI, Department of Applied Physics, Stanford University — Heterointerface of complex oxides provides a rich playground to explore the emergent phenomena that are not found in bulk. In particular, emergent interfacial ferromagnetism has been successfully demonstrated in heterostructures composed of materials which are paramagnetic and antiferromagnetic in bulk. In our previous work, leakage of itinerant electrons from a paramagnetic metal to an antiferromagnetic insulator has been shown to give rise to interfacial ferromagnetism in CaMnO$_{3}$ based superlattices. However interfacial ferromagnetism in insulating superlattices suggests a more complicated scenario. Therefore a thorough investigation of coupling between charge, lattice and spin degrees of freedom is necessary. In this talk, we focus on the NdNiO$_{3}$/CaMnO$_{3}$ system. By choosing a paramagnetic layer that undergoes a metal-insulator transition, we can explore the role of electron itinerancy in interfacial ferromagnetism in the same sample to eliminate the inconsistencies that may originate from the deposition of multiple samples. We demonstrate that NdNiO$_{3}$ exhibits a metal-insulator transition as a function of temperature, which can be tuned as a function of film thickness. We have also grown NdNiO$_{3}$/CaMnO$_{3}$ heterostructures with excellent crystallinity. Preliminary transport measurements indicate that the presence of an adjacent CaMnO$_{3}$ layer also affects the transport in NdNiO$_{3}$ so that charge transfer from the itinerant layer into the adjacent antiferromagnetic insulating CaMnO$_{3}$ is likely not the only contribution to interfacial ferromagnetism.

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