

Abstract Submitted
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Itinerant electron ferromagnetism at GdTiO₃/SrTiO₃ heterostructure MING XIE, ALLAN MACDONALD, The University of Texas at Austin — Interfaces between perovskite oxides have known to support conducting two dimensional electron gases (2DEGs) even when the parent materials are insulators. When one of the insulating parent materials is magnetic, the magnetism is inherited by the 2DEG. We will discuss the itinerant-electron magnetic 2DEGs which occur at GdTiO₃/SrTiO₃ interfaces in which the 2DEG resides on the otherwise non-magnetic SrTiO₃ side of the interface. Experimental studies [1,2] have shown magnetoresistance effects that are characteristic of itinerant electron ferromagnets, but the origin of the magnetic coupling is still not resolved. In this study, we propose that the ferromagnetic state of the 2DEG originates from exchange coupling between 2DEG electrons and electrons localized on GdTiO₃ Ti sites near the interface. We develop a tight binding model that accounts for this coupling and its relation to structural distortion of GdTiO₃ near the interface, and address its influence on 2DEG properties.

[1] P. Moetakef, J. R. Williams, D. G. Ouellette, A. P. Kajdos, D. Goldhaber-Gordon, S. J. Allen, and S. Stemmer, Phys. Rev. X 2, 021014 (2012).

[2] C. A. Jackson and S. Stemmer, arXiv:1311.0337

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