Abstract Submitted
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**Itinerant ferromagnetism in the oxygen-deficient $EuTiO_3$: A first-principles investigation**[1] HAI-XIA CAO, HAI-SHUANG LU, TIAN-YI CAI, SHENG JU, Department of Physics, Soochow University — Effects of oxygen vacancy on the electronic structure and magnetism in the quantum paraelectric $EuTiO_3$ were investigated from first-principles. In contrast to antiferromagnetism in the pristine $EuTiO_3$, itinerant ferromagnetism was revealed in the oxygen-deficient $EuTiO_3$. The origin lies in the spin-polarized Ti $3d$ states, which mediate a ferromagnetic exchange interaction between almost localized Eu $4f$ spins. In addition, this ferromagnetic exchange coupling was strengthened via the partial occupation of Eu $5d$ states. These findings not only explain the observation of ferromagnetism in the unstrained $EuTiO_3$ thin films, but also demonstrate the potential application of $EuTiO_3$ in magnetoelectronics.

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