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Bandgap Controlling of Oxygen-Vacancy-Induced Two-Dimensional Electron Gas in SrTiO3 ZHIQI LIU, NUSNNI-Nanocore, National University of Singapore, WENLAI LU, National University of Singapore, SHENGWEI ZENG, JIAWEN DENG, ZHEN HUANG, CHANGJIAN LI, M. MOTAPOTHULA, WEIMING LU, NUSNNI-Nanocore, National University of Singapore, JIANQIANG ZHONG, PING YANG, National University of Singapore, NINA BAO, NUSNNI-Nanocore, National University of Singapore, WEI CHEN, JINGSHENG CHEN, YUANPING FENG, National University of Singapore, J.M.D. COEY, T. VENKATESAN, ARIANDO ARIANDO, NUSNNI-Nanocore, National University of Singapore — Strongly correlated oxides are full of fascinating phenomena owing to their interacting lattice, charge, spin and orbital degrees of freedom. Here we report a large bandgap enhancement in SrTiO3 thin films due to their defective nature, which was found to significantly change the electronic and magnetic phases in the oxygen-vacancy-induced two-dimensional electron gas at the interface between amorphous LaAlO3 and SrTiO3. Density functional theory calculations show the possibility of the role of Sr/Ti antisite defects on the observed properties. This may open an attractive path to tailor electronic, magnetic and optical properties of SrTiO3-based oxide interface systems under intense focus in the oxide electronics community.

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