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Emerging magnetism and electronic phase separation at titanate interfaces[1] NATALIA PAVLENKO, THILO KOPP, Institute of Physics, University of Augsburg, JOCHEN MANNHART, Max Planck Institute for Solid State Research, Stuttgart — The emergence of magnetism in otherwise nonmagnetic compounds and its underlying mechanisms have become the subject of intense research. Here we demonstrate that the nonmagnetic oxygen vacancies are responsible for an unconventional magnetic state common for titanate interfaces and surfaces. Using an effective multiorbital modelling, we find that the presence of localized vacancies leads to an interplay of ferromagnetic order in the itinerant t2g band and complex magnetic oscillations in the orbitally-reconstructed eg-band, which can be tuned by gate fields at oxide interfaces. The magnetic phase diagram includes highly fragmented regions of stable and phase-separated magnetic states forming beyond nonzero critical defect concentrations.

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