

Emergent Symmetry and Phase Transitions on the Domain Wall of Z₂ Topological Orders

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The boundary and domain walls of topological states can host novel physics. In this work, we theoretically study the one-dimensional (1D) domain wall of 2D Z₂ topological orders. The Ising domain wall model is shown to have an emergent SU(2)₁ conformal symmetry because of a hidden nonsymmorphic octahedral symmetry. While a weak magnetic field is an irrelevant perturbation to the bulk topological orders, it induces a domain wall transition from the Tomonaga-Luttinger liquid to a ferromagnetic order, which spontaneously breaks the anomalous Z₂ symmetry and the time-reversal symmetry on the domain wall. Moreover, the gapless domain wall state also realizes a 1D topological quantum critical point between an antiunitary Z₂-symmetry-protected topological phase and a trivial phase, thus demonstrating the holographic construction of topological transitions.