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Interfacial-state coupling induced topological phase transitions in materials with multiple valleys XIAO LI, QIAN NIU, Department of Physics, University of Texas at Austin — A defining feature of topological insulating phases is symmetry-protected interfacial Dirac states. By exploiting couplings of multiple interfacial Dirac valleys in a binary superlattice, we establish that contrasting valley parity exchange forges a unifying bridge to create various topological phases. Ab initio simulations demonstrate that topological phase transitions can occur due to valley-dependent interfacial-state coupling in both two-dimensional and three-dimensional IV-VI topological crystalline insulators with multiple valleys.

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