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Exactly Solvable Models for Symmetry-Enriched Topological Phases YANG QI, Massachusetts Institute of Technology, MENG CHENG, Yale University, ZHENG-CHENG GU, Chinese University of Hong Kong, SHENGHAN JIANG, Boston College — We construct fixed-point wave functions and exactly solvable commuting-projector Hamiltonians for a large class of bosonic symmetry-enriched topological (SET) phases, based on the concept of equivalent classes of symmetric local unitary transformations. We argue that for onsite unitary symmetries, our construction realizes all SETs free of anomaly, as long as the underlying topological order itself can be realized with a commuting-projector Hamiltonian. We further extend the construction to antiunitary symmetries (e.g. time-reversal symmetry), mirror-reflection symmetries, and to anomalous SETs on the surface of three-dimensional symmetry-protected topological phases. Mathematically, our construction naturally leads to a generalization of group extensions of unitary fusion category theory.

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