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Symmetry-enriched topological invariants from tensor network representations BRAYDEN WARE, Univ of California - Santa Barbara , MENG CHENG, BELA BAUER, Microsoft Station Q — We examine topologically ordered quantum phases in 2+1 dimensions where in the presence of symmetries the topological phase splits into multiple symmetry enriched topological (SET) phases. These SET phases become adiabatically connected when the symmetry is broken, but are separated by phase transitions when symmetry is enforced. Using tensor network representations of representative wavefunctions for certain SET phases, we demonstrate the calculation of the extended modular matrices, a generalization of the well-known modular matrices that have been used to robustly characterize topological phases in numerical calculations. Here, the crucial extension is to systems with symmetry defects. The extended modular matrices are used to form symmetry-enriched topological invariants which distinguish different SET phases.

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