

Classification of symmetry protected topological phases in quantum spin chains

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Abstract: For the classification of symmetry protected topological (SPT) phases, defining an index is a central problem. In a famous paper, Pollmann, Turner, Berg, and Oshikawa introduced \mathbb{Z}_2 -indices for injective matrix products states (MPS) which have either $\mathbb{Z}_2 \times \mathbb{Z}_2$ dihedral group (of π -rotations about x , y , and z -axes) symmetry, time-reversal symmetry, or reflection symmetry.

We introduce an index which generalizes the index by Pollmann et.al. The index is an invariant of the C^1 -classification of SPT phases.