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Symmetries in the entanglement spectrum and topological phases protected by spatial discrete symmetries PO-YAO CHANG, SHINSEI RYU, University of Illinois at Urbana-Champaign — We study topological phases protected by spacial (non-local) symmetries using the entanglement spectrum. Exploiting the structure of the entanglement Hamiltonian that can be formulated as the supersymmetric quantum mechanics, we study how a spacial symmetry constrains the entanglement spectrum when the bipartitioning is consistent with the spatial symmetry. Specific examples we took a look at include a reflection symmetric topological insulator composed of two Chern insulators with opposite chiralities in one and two spacial dimensions. For both topological insulators, the edge states in the physical energy spectrum can be gapped while the entangling boundary remains gapless.

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