

Abstract Submitted
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3D topological states - layer construction, surface topological order and surface symmetry CHAO-MING JIAN, XIAO-LIANG QI, Stanford Univ — 3D topological states can be constructed by stacking layers of 2D topological states and introducing coupling between them. The coupling between layers can effectively drive condensation of anyons in the stacked 2D systems. In the talk, we shall discuss a general layer construction of 3D topological states using the anyon condensation technique for Abelian topologically ordered states in each layer. For the finite size 3D system constructed this way, the emergent surface topological order (including that at the top/bottom and side surfaces) can also be described using the same technique. Extra symmetries can be cooperated into this construction to obtain 3D SPT phases with the symmetries realized in an anomalous way on the gapped surface states. We propose a general criterion to distinguish the symmetry operations that can be realized in a purely two-dimensional topological state from those that can only be realized anomalously on the surface of a higher dimensional state.

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