Half-filled topological flat bands, dualities and SPT surface states

ANDREW POTTER, Univ of California - Berkeley, MAX METLITSKI, Perimeter Institute, ASHVIN VISHWANATH, Univ of California - Berkeley — The surface states of 3D symmetry protected topological phases are impossible to realize in pure 2D systems with a local implementation of symmetry. However, systems with non-local symmetries, e.g. associated with filling or emptying a topological flat band, can circumvent this limitation. A well studied recent example is that of the 1/2-filled Landau level, which effectively realizes the physics of a particular type of time-reversal invariant topological superconductor. In this talk, I will generalize these concepts to other classes of 2D topological flat bands with non-local symmetries, that are related to 3D SPT surface states with local implementations of the same symmetry. This generalization reveals new dualities between strongly interacting gapless phases. In addiition, physical implications for new gapless and topologically ordered states in multicomponent quantum Hall systems will be mentioned.

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