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No-go constraints on topological order in symmetric Mott Insulators MICHAEL ZALETEL, Stanford University, ASHVIN VISHWANATH, University of California, Berkeley — The search for anyonic excitations in Mott insulators (quantum magnets with an odd number of $S = 1/2$ spins per unit cell) has an ally in the Hastings-Oshikawa-Lieb-Schultz-Mattis theorem, which guarantees that a symmetric, gapped Mott insulator must be topologically ordered. However, this theorem is silent on which topological orders are permitted. We point out a new class of symmetry induced constraints on the topological order of a Mott insulator. For example, we show that double semion topological order cannot be realized in a symmetric Mott insulator. An application of our result is to the Kagome lattice quantum antiferromagnet where recent numerical calculations of entanglement entropy indicate a ground state compatible with either toric code or double semion topological order. Our result rules out the latter possibility.

Michael Zaletel
Stanford University

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