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Many-body Localization and Symmetry Protected Topological Order VEDIKA KHEMANI, Princeton University, ANUSHYA CHANDRAN, Perimeter Institute, C.R. LAUMANN, University of Washington, S.L. SONDHI, Princeton University — Recent work shows that highly excited many-body localized eigenstates can exhibit broken symmetries and topological order, including in dimensions where such order would be forbidden in equilibrium. We extend this analysis to discrete symmetry protected order via the explicit examples of the Haldane phase of one dimensional spin chains and the topological Ising paramagnet in two dimensions.

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