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WORKSHOP ON QUANTUM INFORMATION IN QUANTUM MANY-BODY PHYSICS  
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## Stability of frustration-free Hamiltonians

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We prove that gapped Hamiltonians with frustration-free ground states have spectral gap robust against arbitrary local perturbations. In particular, we show that as long as the local groundstates look locally indistinguishable (Local Topological Quantum Order), then sufficiently weak perturbations create a negligible splitting in the groundstate subspace and leave the gap open. Moreover, we show that the Local-TQO condition implies an area law for the entanglement entropy of the groundstates.

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