Abstract Submitted
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Entanglement Spectrum of Topological Insulators[1] F. D. M. HALDANE, Princeton University — Topological order in electronic systems leads to striking features in the "entanglement spectrum" which characterizes quantum entanglement between two halves of a system (FDMH, PRL 101,101504 (2008)). If the system is divided along a translationally-invariant boundary, the spectrum can be labeled by momentum parallel to it, and is gapless if topological order is present. The gapless spectrum is related to gapless edge states that appear at free edges of such systems. Topological insulators have non-trivial one-electron band structure properties; the entanglement spectrum of a non-interacting electron Slater determinant state is itself a non-interacting fermionic spectrum. This spectrum is gapped for "trivial" ordinary insulating band structures, but exhbits characteristic spectral flow and gapless modes when the band structure is topologically non-trivial. As a case study, the entanglement spectrum of the "Haldane model" of a Bloch electron band structure with a zero-field quantum Hall effect will be described in detail, and generalizations to spin-orbit-coupled topological insulators discussed.

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