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Many-body spectral flow index and the Quantum Hall Effect

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We define a many-body topological index to classify invertible and U(1)-symmetric states over the CAR algebra of interacting electrons on an infinitely extended two-dimensional lattice. The definition relies on a magnetic flux insertion through the origin in a quasi-adiabatic way and on the properties of short range entangled states. The index is integer-valued and invariant under charge-preserving locally generated automorphisms. Application to Integer Quantum Hall Effect and analogy with the single particle picture is discussed as well. This talk is based on a joint work with Sven Bachmann and Jacob Shapiro.

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