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## Generalized Hall current on a finite lattice

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Gapped fermion theories with gapless boundary fermions can exist in any number of dimensions. When the boundary has even space-time dimensions and hosts chiral fermions, a quantum Hall current flows from the bulk to the boundary in a background electric field. This current compensates for the boundary chiral anomaly. Such a current inflow picture is absent when the boundary theory is odd dimensional. However, in recent work, the idea of quantum Hall current has been generalized to describe odd dimensional boundary theories in continuous Euclidean space-time dimension of infinite volume. In this talk we extend this idea to a lattice regulated finite volume theory of 1+1 dimensional Wilson-Dirac fermions. This fermion theory with a domain wall in fermion mass can host gapless modes on the wall. The number of gapless fermions is equal to the integral of the divergence of the lattice generalized Hall current.

### Topical area

Theoretical Developments

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