

Fractionalization and interference in mesoscopic rings and saddle potentials

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Abstract:

In strongly-correlated, low-dimensional systems, interactions can give rise to quasiparticles carrying fractional charge and exotic statistics. Here, several proposals will be put forth for pinpointing signatures of such fractionalization in different geometries. It will be shown that power maps of quasiparticle motion around a thin ring can act as measures of charge fractionalization, complementary to recent cutting-edge studies in etched quantum wires. A proposal will be presented for probing non-Abelian statistics of fractional vortices in superconducting mesoscopic rings. Finally, it will be shown that in the quantum Hall setting, the application of a saddle potential results in the analog of a quantum optics beam splitter, and provides a probe for Abelian quasiparticle statistics.