

Title: Neutral-mode localization in fractional quantum Hall junctions

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Abstract:

Edges of quantum Hall phases give rise to a multitude of exotic modes supporting quasiparticles of different values of charge and quantum statistics. Among these are neutralons (chargeless anyons with semion statistics), which were found to be ubiquitous in fractional quantum Hall matter. Studying and manipulating the neutral sector is an intriguing and interesting challenge, all the more so since these particles are accessible experimentally. I will address two gapping mechanisms involving neutralons. One—giving rise to “neutralon superconductivity”, where pairing is replaced by a quartet mechanism. The other leads to localization via neutral-mode backscattering. Under the assumption of ballistic transport in the arms connecting the “neutralon junction” to contacts, the two-terminal conductance of the junction is found to be $4/3$ for the former localization channel and $1/3$ for the latter. The four-terminal conductance matrix reveals a strong quantized drag with opposite signs for the two gapping mechanisms.