
Superconductivity of neutral modes in quantum Hall edges

Jukka Väyrynen^{*1}, Moshe Goldstein², and Yuval Gefen³

¹Purdue University [West Lafayette] – United States

²Tel Aviv University – Israel

³Weizmann Institute of Science [Rehovot, Israël] – Israel

Abstract

The 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. Here, we address the limit of strongly interacting neutralons giving rise to neutralon superconductivity, where pairing is replaced by a quarteting mechanism. We discuss several manifestations of this effect, realizable in existing experimental platforms. Furthermore, this superconducting gapping mechanism may be exploited to facilitate the observation of interference of the accompanying charged anyons.

^{*}Speaker