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Séminaire du Laboratoire de Physique Théorique de la Matière Condensée

Lundi 2 Novembre 2020, 10 :45
LPTMC, On-line zoom seminar(On-line https ://zoom.us/j/93941768511 ?pwd=MDhHUE1zTGRV
ID de réunion : 939 4176 8511 Code secret : 718320)
Domaines : cond-mat.mes-hall

Titre : *Electrical detection of non-Abelian statistics in topological superconductors*

Orateur : **Aurélien Grabsch (LPTMC)**

Résumé : *Topological superconductors can support quasiparticle excitations which present unusual exchange statistics, called non-Abelian anyons. They correspond to midgap states localized in the core of a vortex or bound to the end of a nanowire. However, their unusual statistics cannot be easily demonstrated as they are immobile, and one should rely on indirect methods. Here, we propose a real space alternative which relies on the chiral motion along the edges of a topological superconductor. We present an approach which allows to inject on demand so-called edge vortices, which are pi-phase domain walls which propagate along the chiral edge channels, and possess non-Abelian statistics. We show that the signatures of this unusual exchange statistics can be detected in an electrical measurement. Ref : - Electrical detection of the Majorana fusion rule for chiral edge vortices in a topological superconductor, C.W.J Beenakker, A. Grabsch, Y. Herasymenko SciPost Phys. 6, 022 (2019) - Time-resolved electrical detection of chiral edge vortex braiding, I. Adagideli, F. Hassler, A. Grabsch, M. Pacholski, C.W.J. Beenakker, SciPost Phys. 8, 013 (2020) - Half-integer charge injection by a Josephson junction without excess noise, F. Hassler, A. Grabsch, M. J. Pacholski, D. O. Oriekhov, O. Ovdat, I. Adagideli, and C. W. J. Beenakker, Phys. Rev. B 102, 045431 (2020)*