Canadian Association of Physicists

Association canadienne des physiciens et physiciennes

Contribution ID: **204** Type: **Oral not-in-competition (Graduate Student) / Orale non-compétitive (Étudiant(e) du 2e ou 3e cycle)**

Reducing Majorana Hybridization via Periodic Driving

Wednesday 9 June 2021 13:05 (3 minutes)

It is an ongoing challenge to engineer setups in which Majorana zero modes at the ends of one-dimensional topological superconductor are well isolated which is the essence of topological protection. Recent developments have indicated that periodic deriving of a system can dynamically induce symmetries that its static counterpart does not possess [1]. We further develop the original protocol [2] where this idea [1] is applied to a system of quantum dot (QD) coupled to a Kitaev chain hosting an imperfect (overlapping) Majorana zero modes. We numerically simulate a protocol in which an electron periodically hops back and forth from the QD and the wire. We demonstrate that the current protocol reduces a non-zero hybridization energy that manifests from imperfect Majoranas by orders of magnitude. Furthermore, we examine the efficiency of the suppression and how robust it is to imperfections.

[1] K. Agarwal and I. Martin, Phys. Rev. Lett. **125**, 080602 (2020).

[2] I. Martin and K. Agarwal, PRX Quantum **1**, 020324 (2020).

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Session Classification: W2-9 Contributed Talks II (DCMMP) / Conférences soumises II (DPMCM)

Track Classification: Condensed Matter and Materials Physics / Physique de la matière condensée et matériaux (DCMMP-DPMCM)