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Majorana bound states in a two-dimensional topological superconductor

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It was first shown in 2010 that a single atomic layer of Pb deposited on top of a Si substrate becomes superconducting at low temperature. This purely two-dimensional system is an ideal platform for scanning tunneling experiments on superconductors. In particular, due to the presence of spin-orbit at the interface, topological superconductivity can be induced in such system. By forming Co nanoclusters below the Pb layer, the Co magnetism can induce a region of topological superconductivity with associated edge states[1]. I will present our study of this system and in particular the topological edge states and bound states that we observed[2] and compare them with the trivial signatures of magnetism in the same system.

[1] G. Ménard et al., Two-dimensional topological superconductivity in Pb/Co/Si(111), Nature comm. 8, 2040 (2017).

[2] G. Ménard et al., Isolated pairs of Majorana zero modes in a disordered superconducting lead monolayer, arXiv:1810.09541 (2018).

Choix de session parallèle

3.3 Propriétés remarquables des matériaux topologiques : de la théorie à la réalisation expérimentale

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