Séminaire AXE 1 - Sciences et Matériaux Quantiques

Mardi 21 Mai 2024 | 11:00 | Auditorium de l'IPCMS

Rémy Pawlak

University of Basel, Department of Physics
remy.pawlak@unibas.ch

Gate-tunable topological superconductivity in a supramolecular electron spin lattice.

Topological superconductivity emerges in chains or arrays of magnetic atoms coupled to a superconductor. However, the external controllability of such systems with gate voltages is detrimental for their future implementation in a topological quantum computer. Here we showcase the supramolecular assembly of radical molecules on Pb(111), whose discharge is controlled by the tip of a scanning tunneling microscope [1]. Charged molecules carry a spin-1/2 state, as confirmed by observing Yu-Shiba-Rusinov in-gap states by tunneling spectroscopy at millikelvin temperature. Low energy modes are localized at island boundaries with a long decay towards the interior, whose spectral signature is consistent with Majorana zero modes protected by mirror symmetry [2]. Our results open up a vast playground for the synthesis of gate-tunable organic topological superconductors.

References:

[1] C. Li et al. Nat. Comm. 14, 5958 (2023)
[2] R. Pawlak et al. https://doi.org/10.48550/arXiv.2310.18134
[3] C. Li et al. in preparation

Contact : **Arnaud Gloppe et Guillaume Schull**