



Münchner Physik- Kolloquium

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Quantum Engineering of Majorana Fermions in Topological Superconductors

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Monday, 26 April 2021, 17:15 h

<https://tum-conf.zoom.us/j/93234766313> Meeting-ID: 932 3476 6313 Passwort: Kolloquium
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The experimental observation of Majorana bound states in topological superconductors represents a major breakthrough in realizing their applications in topological quantum computing and has stimulated the search for new possibilities to create and manipulate Majorana states at the nanoscale. Of particular interest are here magnetic-superconducting hybrid (MSH) structures in which islands of magnetic adatoms are placed on the surface of s-wave superconductors.

In this talk, I will provide several examples for quantum engineering of Majorana fermions in topological superconductor. In particular, I will demonstrate (a) the emergence of topological superconductivity using magnetic skyrmion lattices in MSH structures, and (b) the possibility to adiabatically tune MSH systems between 2D and 1D topological phases. Moreover, I will discuss the discovery of chiral Majorana edge modes in Fe-Re MSH structures and the associated signatures in STS experiments. Finally, I will discuss the characteristic signatures of topological superconductivity in the iron-based superconductors.

