"Signatures of Majorana fermions in Shiba chains with or without spin-orbit interaction"

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Abstract: Recent spin polarized scanning tunneling microscopy (SPSTM) experiments in magnetic chains [1] opened new routes for detecting the elusive Majorana fermions (MFs). Within the deep Shiba limit we calculate [2] the spatially resolved tunneling conductance of topological ferromagnetic chains [1,3] measurable by means of SPSTM. Our analysis reveals novel signatures of MFs arising from the interplay of their strongly anisotropic spin-polarization and the magnetization content of the tip. We investigate the occurrence and evolution of zero/finite bias peaks for a single or two coupled chains forming a Josephson junction, when a preexisting chiral symmetry controlling the number of MFs per chain edge is preserved or weakly broken. We also reveal alternative routes for engineering MFs without spin-orbit interaction (SOI). On one hand, we highlight that antiferromagnetic Shiba chains become topological by inducing an artificial SOI using external fields [4], while on the other, we pursue mechanisms for stabilizing magnetic textures and topological Shiba lattices following the self-organization principle for topological spiral chains [5].


12:00pm
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Duboc Room (4-331)

Host: Jorn Venderbos