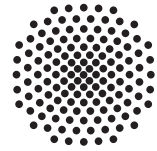


Stuttgarter Physikalisches Kolloquium

Max-Planck-Institut für Festkörperforschung
Fachbereich Physik, Universität Stuttgart

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Hybrid

Login data will be announced by e-mail and on the colloquium webpage.

Dienstag, 3. Dezember 2024

16.15 Uhr

Lecture Hall 2D5

Max-Planck-Institut für Festkörperforschung, Heisenbergstraße 1, 70569 Stuttgart-Büsnau

Topological superconductivity in twisted double-layer high- T_c cuprates: Theory, experimental signatures and applications

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Abstract

Structures composed of two monolayer-thin d-wave superconductors with a twist angle close to 45° are predicted to form a robust, fully gapped topological superconducting phase with spontaneously broken time-reversal symmetry and protected chiral edge modes. In this talk I will review the theory behind the topological phase and discuss recent experimental efforts to fabricate and probe twisted flakes of high- T_C cuprate $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$. Signatures of d-wave symmetry and of spontaneous T-breaking are indeed visible in the device Josephson current response, as detected through a pronounced superconducting diode effect observed in samples near 45° twist but absent in untwisted samples. Time permitting, a potential application of this new physics to an improved transmon qubit will also be discussed.