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Type: **Focus session invited talk**

Chiral topological superconductivity in Sn/Si(111) and related compounds

Monday 1 December 2025 11:30 (30 minutes)

Motivated by the recently discovered superconductivity in boron-doped Sn/Si(111) with a T_c as high as 10K [1], I will focus on unconventional superconductivity of correlated electrons on the triangular lattice. I will further demonstrate the significance of Rashba spin-orbit coupling for materials such as Sn/Si(111) and show that, as a consequence, the superconducting phase possesses a surprisingly rich Chern-number landscape [2]. I will discuss the implications of our findings for Sn/Si(111), compare observables and also emphasize the significance of related compounds such as Pb/Si(111), Sn/SiC(0001) and Pb/SiC(0001) [3].

References:

1. F. Ming et al., Evidence for chiral superconductivity on a silicon surface, Nat. Phys. 19, 500 (2023).
2. M. Bunney, J. Beyer, R. Thomale, C. Honerkamp, S. Rachel, Chern number landscape of spin-orbit coupled chiral superconductors, Phys. Rev. B Letters 110, L161103 (2024).
3. L. Marchetti, M. Bunney, D. Di Sante, S. Rachel, Electronic structure, spin-orbit interaction and electron-phonon coupling of triangular adatom lattices on semiconductor substrates, Phys. Rev. B 111, 125115 (2024).

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Session Classification: Focus Session - From edge states to emergent phases

Track Classification: Focus sessions: From Edge States to Emergent Phases: Advances in Topological and Strongly Correlated Materials