

# On-line SPICE-SPIN+X Seminars



**Wednesday, 30th June 2021, 15:00 (German Time)**

The seminar will be via Zoom ([Meeting ID: 878 2485 9843](#)) and live streamed in the SPICE YouTube Channel.



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## **Building and investigating magnetic adatom chains on superconductors atom by atom**

Magnetic adatom chains on superconducting substrates are promising platforms for topological superconductivity and Majorana zero modes. Signatures of these have been found in densely-packed chains with direct exchange interaction among the adatoms. Here, we investigate adatom chains in the “dilute” limit. This means that the atoms are sufficiently far spaced that direct hybridization of their d orbitals is negligible, but close enough for sizeable substrate-mediated interactions. We build these chains from individual Fe atoms on a 2H-NbSe<sub>2</sub> substrate. Using scanning tunneling microscopy and spectroscopy we first characterize the exchange coupling between the magnetic adatoms and the superconductor by detecting their Yu-Shiba-Rusinov states within the superconducting energy gap. We then use the tip of the STM to assemble dimers, trimers and chains of these Fe atoms. In each step, we track the evolution of the Yu-Shiba-Rusinov states and identify magnetic interactions, hybridization and band formation.