

O 57: Key Note V

Time: Wednesday 10:00–10:30

Location: R1

Plenary Talk

O 57.1 Wed 10:00 R1

Tunneling spectroscopy of magnetic adatoms on superconductors — •KATHARINA J. FRANKE — Freie Universität Berlin, Berlin, Germany

Magnetic atoms on superconductors induce an exchange coupling, which leads to states within the superconducting energy gap. We probe these so-called Yu-Shiba-Rusinov (YSR) states of individual adatoms on a Pb surface by scanning tunneling spectroscopy [1]. When the adatoms are brought into sufficiently close proximity, the YSR states hybridize [2] and may lead to the formation of topological states in extended adatom chains [3].

Single-electron tunneling through YSR states requires relaxation of the excited state. At strong tunnel coupling, thermal relaxation is not sufficiently fast and resonant Andreev processes become the dominant tunneling process. We obtain direct evidence of these two transport regimes by inserting GHz radiation into the STM junction and analyzing the photon-assisted tunneling maps [4,5].

[1] M. Ruby, et al., Phys. Rev. Lett. 117, 186801 (2016).

[2] M. Ruby, et al., Phys. Rev. Lett. 120, 156803 (2018).

[3] S. Nadj-Perge, et al., Science 346, 602 (2014).

[4] O. Peters, et al., Nature Phys. 16, 1222 (2020).

[5] S. Acero Gonzalez, et al., Phys. Rev. B 102, 045413 (2020).