SFB/TRR 21 - Colloquium

21. April 2017, Tübingen

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Unconventional superconductivity in FeSe analyzed with scanning tunneling spectroscopy

FeSe is one of the few unconventional superconductors that does not require doping to become superconductive. This allows us to study the interplay between the electronic band structure and electron-boson coupling in the pure form. We used low-temperature scanning tunneling microscopy (STM) and spectroscopy (STS) down to 30 mK to reveal the multi-band nature of the superconducting phase, to obtain information on the bosonic pairing mechanism and to reveal the orbital contributions to the gap.

Key aspect of this work is the insight that electron-electron coupling via exchange of virtual bosons is fundamentally linked to a simpler process, the creation of real bosons by hot electrons accessible via inelastic tunneling spectroscopy. We studied both bulk FeSe samples with Tc=9K and monolayers of FeSe on STO with Tc>50K.

21. April 2017, 15:30 Uhr

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