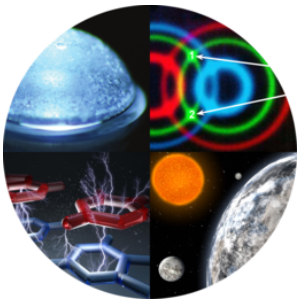

Münchner Physik-Kolloquium

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Influence of spin-orbit coupling on superconductivity

Prof. Dr. Elena Hassinger, *TUM & MPI Chemische Physik fester Stoffe*

Monday, 11 January 2021, 17:15 h
https://tum-conf.zoom.us/j/93234766313 Meeting-ID: 932 3476 6313 Password: Kolloquium
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Discoveries of new superconducting materials with unexpected properties still surprise physicists regularly. An examples from last year is the room-temperature superconductivity in carbon-sulfure hydride compounds under high pressure. Although this is a breakthrough discovery, the superconducting state itself is rather conventional in these compounds, as it can be described by the standard theory on superconductivity (Baardeen-Cooper-Schrieffer theory). In this talk, I report on the discovery of superconductivity with unconventional properties in a cerium compound. Although it appears at temperatures below 1 K, the superconducting state is extremely robust under the application of magnetic fields. Most interestingly, for magnetic fields applied along the crystallographic c-axis, two separate superconducting states appear, evidenced by a transition inside the superconducting state. The phase diagram can be understood by taking into account the staggered spin-orbit coupling at the Ce position. In that picture, the magnetic field drives a transition from even to odd parity superconductivity which has never been observed before and is an evidence of the strong influence of the spin-orbit coupling on the superconducting state. This insight advances the theoretical description of a range of unconventional superconductors.