UNIVERSITÄT DUISBURG ESSEN

PHYSIK E=

Physikalisches Kolloquium

Mittwoch, 18.12.2024
13:00 Uhr
MC 122 und Zoom

https://uni-due.zoom-x.de/j/64228670246?pwd=RjVQeFNIUkRKRkpiNVpKYXhJaFNLdz09 (gilt für alle Vorträge)

Strange metallicity and superconductivity

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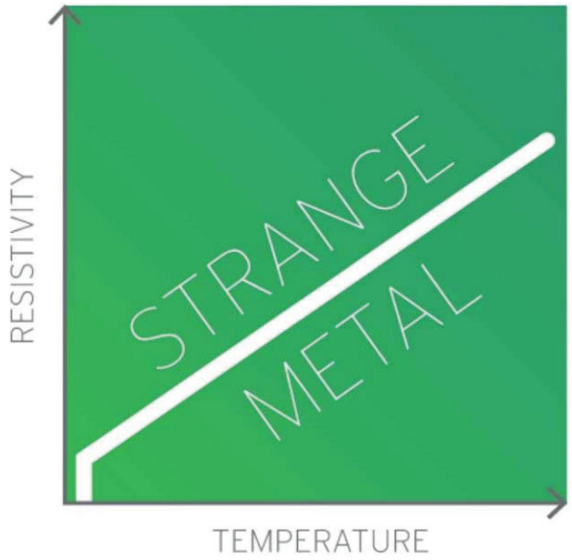

In conventional superconductors, one of the key parameters fixing the robustness of the superconductivity is the electron–phonon coupling strength λ. This in turn is closely related to λtr, the parameter that defines the transport scattering rate associated with the linear-in-temperature resistivity that is characteristic of a normal metal. This link between the coefficient of the T-linear resistivity α and the superconducting transition temperature Tc is enshrined in the old adage; “good metals make bad superconductors”. In certain unconventional superconductors, including the high-Tc cuprates, a similar correlation exists, albeit with a T-linear resistivity that extends to anomalously low temperatures indicative of a unconventional or ‘strange’ metal. Despite this complication, the search for an associated λ has been prolonged and intense. In this talk, I will present a series of electrical transport studies of both electron- and hole-doped cuprates, carried out under intense magnetic fields, that reveal two key findings about the strange metal and its link with superconductivity. On the electron-doped side, we have succeeded to identify the relevant λ as well as its origin. On the hole-doped side, however, their magneto-transport properties suggest an altogether different origin for the T-linear resistivity (i.e. one that is not related to scattering off a bosonic bath) and, in turn, an entirely new paradigm for high-Tc superconductivity.