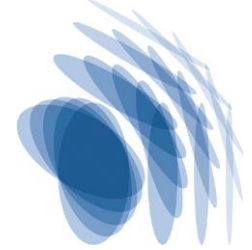


Max-Planck-Institut für Struktur und Dynamik der Materie

Max Planck Institute for the Structure and Dynamics of Matter



IMPRS UFAST Call for PhD applications 2025/2026

PM1 - Non-Equilibrium Transport in High-Tc Superconductors



Title of PhD Project	Non-Equilibrium Transport in High-Tc Superconductors
Type	Experimental
Supervisor(s)	Prof. Philip Moll Dr. Carsten Putzke
Affiliation(s):	Max Planck Institute for the Structure and Dynamics of Matter
Number of positions:	2
Abstract:	<p>The question whether the large variety of electronic ground states in the phase diagram of high-T_c cuprates are competing with or promoting high temperature superconductivity, or if a possible quantum critical point lays at the heart of high-T_c superconductivity is under constant debate.</p> <p>In this project we aim for a better understanding of the interplay between the large number of ground states with a novel approach. Instead of suppressing superconductivity with high magnetic field, which could also affect other phases of interest themselves, we will use high, ultra-short current pulses in micro-structured devices to suppress superconductivity, forcing the system to reveal its unmasked correlated ground state in electrical transport measurements.</p> <p>In addition, the project holds the potential for the discovery of new ground states that are prevented by the formation of cooper pairs in the high-T_c superconducting phase. One example is the stabilization of charge order in high magnetic $\text{YBa}_2\text{Cu}_3\text{O}_{6+\delta}$.</p> <p>This project combines state of the art experimental capabilities in micro-structuring of quantum matter, the preparation of specialized sample environments by clean-room technology as well as the development of electrical transport measurements in the ultra-fast time scale at low temperatures and high magnetic field.</p>
Contact person for scientific questions about the project:	Prof. Philip Moll: philip.moll@mpsd.mpg.de Dr. Carsten Putzke: carsten.putzke@mpsd.mpg.de
Research Group Website:	https://www.mpsd.mpg.de/research/microstructured-quantum-matter

