



IMPRS UFAST Call for PhD applications 2021/2022



Multi-Dimensional Terahertz Spectroscopy of Quantum Materials

A. Cavalleri-1

Title of PhD Project	Multi-Dimensional Terahertz Spectroscopy of Quantum Materials
Type	Experimental
Supervisor(s)	Prof. Andrea Cavalleri
Affiliation(s):	Max Planck Institute for the Structure and Dynamics of Matter
Number of positions:	1
Abstract:	<p>The physics of quantum materials such as high-T_C superconductors and correlated complex oxides is often determined by fundamental excitations at terahertz frequencies. Recently, the development of high-intensity, coherent radiation sources in this frequency range has enabled spectroscopic probes of these excitations at their fundamental energy scales. However, experiments thus far have primarily been limited to conventional pump-probe spectroscopies.</p> <p>We seek to push the technological limits of ultrafast spectroscopies by developing a terahertz analogue of nuclear magnetic resonance, termed multi-dimensional terahertz spectroscopy (MDTS). This technique provides unique insight into the physics of quantum materials by unfolding their nonlinear optical response into a multi-dimensional spectrum. An exemplary system of interest is high-T_C cuprate superconductors, in which MDTs can answer fundamental questions concerning, for example, the mechanisms underlying competing/intertwined orders and the role of disorder in their phase transitions.</p> <p>We offer a PhD position in this project, giving you the chance to setup and perform these state-of-the-art experiments while contributing to our understanding of quantum materials.</p>
Contact person for scientific questions about the project:	andrea.cavalleri@mpsd.mpg.de michael.foerst@mpsd.mpg.de