



IMPRS UFAST Call for PhD applications 2026/2027

PM5 - Exploring intrinsic orbital dynamics in Kagome metals



Title of PhD Project	Exploring intrinsic orbital dynamics in Kagome metals
Type	Experimental
Supervisor(s)	Prof. Philip Moll Dr. Chunyu Guo
Affiliation(s):	Max Planck Institute for the Structure and Dynamics of Matter
Number of positions:	1
Abstract:	Electron correlations significantly modify electron self-organization in quantum materials, resulting in a landscape of competing orders and exotic quantum phenomena. The recently discovered AV_3Sb_5 family Kagome superconductors is an intriguing example of competing correlated orders with robust entanglement, as manipulating one order can affect or modify another, akin to the unique electromagnetic responses of multi-ferroics. Nevertheless, it renders the inherent characteristics practically inaccessible through conventional means, as even slight variations in experimental conditions can significantly affect their physical properties. Therefore, to probe the unperturbed properties of these materials, we will utilize a strain-free approach based on a unique force-free setup that features controllable mechanical and thermal coupling between the focused-ion-beam (FIB) fabricated microstructure and its supporting frame. The overarching goal is to investigate the novel electronic response in these Kagome superconductors due to their non-trivial orbital dynamics.
Contact person for scientific questions about the project:	Prof. Philip Moll: philip.moll@mpsd.mpg.de Dr. Chunyu Guo: chunyu.guo@mpsd.mpg.de
Research Group Website:	https://www.mpsd.mpg.de/research/microstructured-quantum-matter