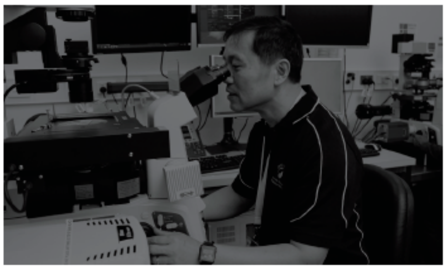
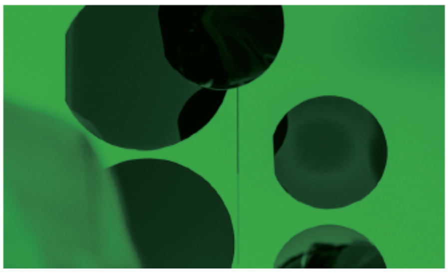


Focused Ion Beam machining of 3D quantum materials

Prof Philip Moll
Director,
The Max-Planck Institute for the Structure and Dynamics of Solids
Hamburg, Germany

4:30pm, 14/09/2023
Melbourne Centre for Nanofabrication
151 Wellington Road, Clayton, 3168
Zoom link: click here
Meeting ID: 860 4541 7242 and passcode: 998923

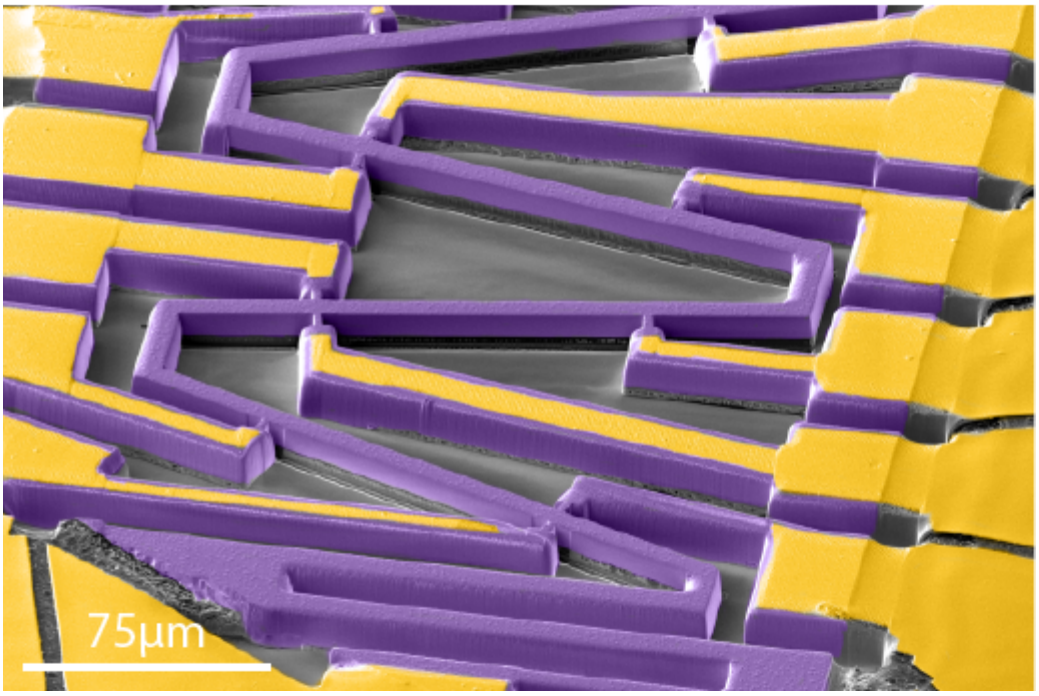


Focused Ion Beam machining of 3D quantum materials

Prof Philip Moll
The Max-Planck Institute for the Structure and Dynamics of Solids
Hamburg, Germany

E: philip.moll@mpsd.mpg.de
W: https://www.mpg.de/17105320/structure-and-dynamics-of-matter-moll

Abstract:
New materials will play a key role in technologies that address our current challenges. In electronics, both classical beyond-silicon as well as quantum coherent computing have a strong materials dimension. At the same time, obtaining crystalline micro- and nano-devices from chemically complex materials for prototyping is a sizable challenge. Our research group tackles this by driving focused ion beam (FIB) based methods to carve such 3D microscopic circuits from as-grown crystals and powders of complex matter. We pursue both the basic physics of these materials, with an emphasis on superconductivity, density waves, topological transport and strongly correlated electron systems; as well as investigate the role of confined 3D geometries on the unconventional states they host. Quantum transport is the main tool to characterize the device properties in high magnetic fields and at mK temperatures. The key features of this method are presented, with its capabilities and limitations, and a few examples are reviewed.



Prof Philip Moll is a director at the Max-Planck Institute for the Structure and Dynamics of Solids in Hamburg, Germany. His "microstructured quantum matter" department investigates electronic transport on mesoscopically shaped 3D crystals of quantum materials. The group develops novel workflows based on Focused Ion Beam machining to define material geometries on the mm to nm scale. Philips group regularly contributes to the research on various classes of quantum materials, including topological semi-metals, unconventional superconductors, heavy fermions and correlated magnets. With his recent move from EPFL, the group tackled new challenges in the field of Kagome metals. When not sculpting micro-crystals, Philip enjoys spending time with the family and his kids.