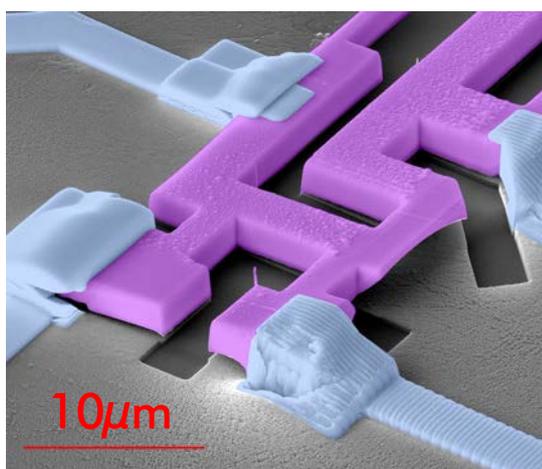




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Open PhD position: Mesoscale fabrication of high temperature superconductors



Our group investigates how correlated electronic ground states such as superconductivity, density waves or magnetism change when the sample size is smaller than the relevant physical length scale of the system. We therefore develop new approaches to fabricate microstructures of highest crystalline quality on the $>10\mu\text{m}$ -100nm scale using Focused Ion Beam machining.

Project: High temperature superconductivity is found to coexist with other correlated phases. Recently a charge-density-wave has been found to coexist with superconductivity in cuprates. In iron-based superconductors, spin-density waves and a potential electronic nematic phase exists in the vicinity of superconductivity. Understanding the role of these phases, whether they are competitive or collaborative, is a key challenge in the field and may show new ways towards more robust superconductivity with higher transition temperatures.

The PhD project will involve a broad spectrum of experimental techniques and state-of-the-art nanofabrication. You will develop new approaches to fabricate mesoscale structures, similar to the $\text{SmFeAs}(\text{O},\text{F})$ structure shown above, from oxide superconductors. The project involves the use of extreme pulsed magnetic fields to tune these quantum ground states up to 100T. You will perform regularly experiments at the National High Magnetic Field Laboratory in the United States, providing you with the opportunity to build an international research network and gain broad experience in the field. You will make full use of the Institute's excellent and brand new cleanroom facility that gives access to electron beam lithography, laser lithography and Focused Ion Beam milling.

Student Profile: Candidates should have a strong background in condensed matter physics, and show the ability to work independently, in particular when driving the high field experiments.

We are looking forward to your application at philip.moll@cpfs.mpg.de. For more information about our young and vibrant group, please visit us at www.miquamat.de.