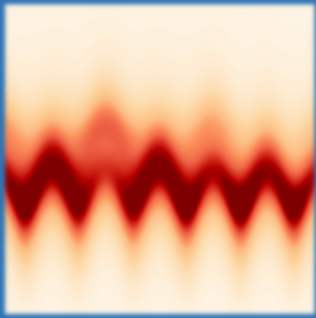


# REVEALING THE SECRETS OF QUANTUM MATERIALS



The *Correlated Quantum Matter Group* works on revealing the atomic-scale underpinnings of quantum materials. These materials show a plethora of novel and emergent states that are frequently promising for future applications. Our research is focused on *making, measuring & tuning quantum materials*. We carry out this work both in more conventional laboratories as well as at large-scale research facilities at the Paul Scherrer Institute (PSI). We offer BSc/MSc projects in all these areas, which allow to learn a broad set of experimental skills.



Learn more about our group

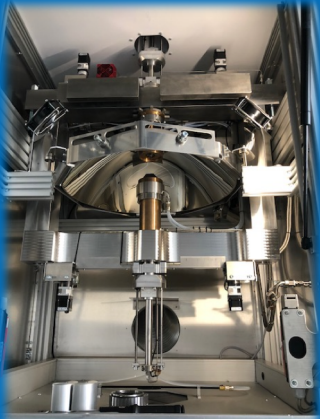


Learn about quantum matter



Learn about PSI's large-scale facilities

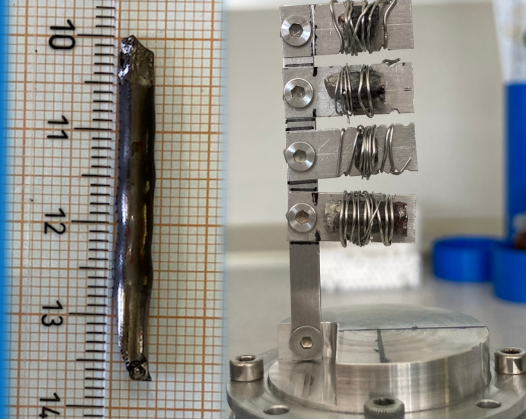
## Making Quantum Materials



High pressure float zone furnace



Czochralski single crystal growth



Large single crystals for neutron spectroscopy

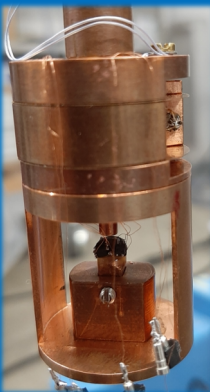


X-ray diffraction for material characterization

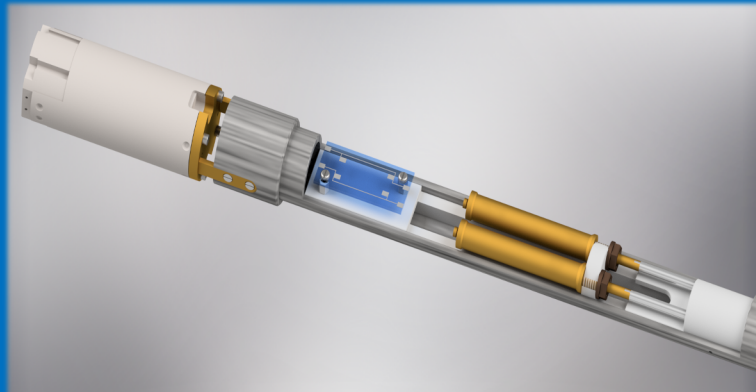
### Available Projects

MSc 1: Synthesize novel quantum materials and characterize them using x-ray diffraction as well as thermal and magnetic measurements.

## Tuning & Measuring Quantum Materials and Design of New Instrumentation



Thermal Expansion Setup for High Magnetic Fields & Ultra-Low Temperatures



Development of new Nuclear Magnetic Resonance (NMR) Probe



Strain Cell for Applying Uniaxial Pressure

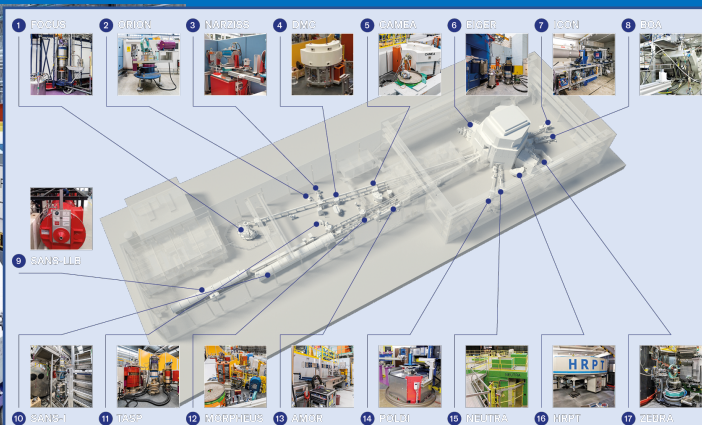
### Available Projects

- BSc 1: Carry out thermal expansion measurements on topological magnets with potential for spintronics and novel memory devices.
- BSc 2: Carry out specific heat measurements at ultra-low temperature to study quantum matter close to a quantum phase transition in a correlated metal.
- MSc 2: Carry out NMR measurements on quantum magnets that act as quantum simulators to test our knowledge of quantum states.
- MSc 3: Design a resonant ultrasound setup used to probe unconventional superconductors and topological magnets.

## Neutron Scattering Experiments at PSI to Probe Atomic-Scale Structures & Interactions



Swiss Spallation Neutron Source SINQ at PSI



Instrument suite of SINQ at PSI enabling us to perform neutron diffraction and spectroscopy experiments on quantum matter



Triple-axis spectrometer TASP at SINQ

Learn more about neutron scattering at PSI



### Available Projects

- BSc 3: Participate in a neutron scattering campaign on quantum materials and analyze data.
- MSc 4: Write data analysis tools for the interpretation of complex neutron scattering data sets.
- MSc 5: Carry out neutron scattering experiments on topological materials and tune them with strain.