Tuning Quantum Materials by Uniaxial Stress

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Abstract

Quantum materials have fascinating quantum phenomena result from interplay of charge, spin, orbitals and lattice. Materials with strong electron-electron correlation show rich phase diagrams containing different ground states, which can be tuned by external parameters, e.g. doping, pressures, etc. Recently, uniaxial stress has become a practical experimental tuning knob in studying quantum materials. My research interests since the past decade have mainly focused on tuning unconventional superconductors. Here, I will take Sr₂RuO₄ as an example to demonstrate versatility of the uniaxial stress techniques. I will, then, discuss our main findings based on the thermodynamic probes (elastocaloric effect and heat capacity) I have developed.

Brief biography

Dr. You-Sheng Li earned his B.S. and M.S. from National Tsing Hua University in 2006 and 2009. He received his Ph.D. from University of St Andrews (UK) in 2018. He then conducted postdoctoral research at Universität Würzburg, Germany in 2019 and Max Planck Institute for Chemical Physics of Solids, Germany from 2020 to 20203. In 2024, he joined Department of Physics at National Taiwan University as an assistant professor.