

# 凝聚态物理-北京大学论坛

北京大学物理学院凝聚态物理与材料物理研究所  
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## Exotic phenomena in two-dimensional superconductors

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时间: 11月19日 (星期四) 15:00—16:30

地点: 北京大学物理大楼中212大教室

**摘要 (Abstract)** : Two-dimensional crystalline superconductors possess a variety of exotic properties. In this talk, I will present our recent studies on the emergent superconductivity in few-layer stanene as well as superconductor-insulator or superconductor-metal transition induced by lithium ion intercalation. In the first part, I will report the discovery of superconductivity in few-layer stanene—ultrathin gray tin (111). Few-layer stanene not only exhibits two-dimensional superconductivity but also topologically non-trivial band structures. Furthermore, they host enhanced in-plane upper critical fields that greatly exceed the conventional limit. We propose that this anomalous behavior stems from a novel type of Ising pairing. In the second part, I will present the application of a recently emerged solid-state gating technique. By using this technique, we are able to continuously tune a high temperature cuprate superconductor from the optimal doping to the under-doped regime. We further employ this technique to induce superconductivity in titanium diselenide. Interestingly, we observe an anomalous metal phase in this system. Furthermore, this phase coexists with the enigmatic resistance oscillations due to periodic electronic structures.

**报告人简介 (Aboutspeaker)** : Ding Zhang is an associate professor (tenure-track) in Department of Physics, Tsinghua University. In 2008, he received his bachelor's degree from School of Physics, Peking University. From 2008 to 2014, he did his PhD at Max Planck Institute for Solid State Research in Germany under the supervision of Prof. Klaus von Klitzing (Nobel laureate). He joined Tsinghua first as a postdoc and started his tenure track in 2016. He is an experimentalist in condensed matter physics, with the current interest in low-dimensional superconductivity, high temperature superconductivity, and low-temperature transport techniques. Ding Zhang has published over 30 papers. He is the corresponding author or first author for 15 of them, including 1 Science, 1 Nature Physics, 1 Nature Communications and 3 Physical Review Letters.

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