



Department of Mechanical Engineering The University of Hong Kong



SEMINAR

Title: Unconventional superconductivity in lithium intercalated bilayer MoS₂

Speaker: Dr. Dong Zhao
Max Planck Institute for Solid State Research
Germany

Date: 5 September, 2023

Time: 10:30am

Venue: Seminar Room 7-34/35 Haking Wong Building, HKU

Abstract

A phase characterized by a spatially-modulated order parameter is counter-intuitive because of the entropy penalty that the modulations incur. Its possible existence in superconductors was first proposed under conditions that the formation of Cooper pair is limited to some segments of the Fermi surface and that the Cooper pairs carry momentum above the Pauli limit. This prediction motivated experimental efforts to identify such non-uniform superconducting states in organic superconductors, heavy fermion compounds and cuprates. Here we report evidence for another type of finite-momentum pairing that manifests below the Pauli limit. It is driven by the orbital effect and does not rely on Fermi surface segmentation. We have evidence for this spatially modulated superconducting state in a hexagonal MoS₂ bilayer through remote intercalation that offers both balanced doping and firm out-of-plane coherence across both layers.



Biography:

This talk is given by Dr. Dong Zhao from the Max Planck Institute for Solid State Research, Germany. Dr. Zhao has been actively involved in a broad research area, including organic semiconductors, ferroelectric and piezoelectric materials, and superconductivity in two-dimensional systems, with more than twenty publications. He received his Bachelor degree in physics in 2011 from Peking University. He did his Master Thesis in 2013 at Philips Research Laboratories in Aachen, Germany, on exciton physics in organic light-emitting diodes, and received his Master degree from Karlsruhe Institute of Technology, Germany. In 2017, he received his PhD degree from the Max-Planck Institute for Polymer Research, Germany, with his Thesis "Polarisation dynamics in ferroelectric thin films". Since 2017, he has been working as a Postdoc at the Max-Planck Institute for Solid State Research, Germany. His current research interest is superconductivity in two-dimensional materials and heterostructures.

ALL INTERESTED ARE WELCOME

For further information, please contact Prof. Y. Lu at 3910 2155.