Condensed Matter Physics Seminar Series

Signature of Chiral Superconductivity in Chiral Molecular-Intercalated Two-Dimensional Superconductor

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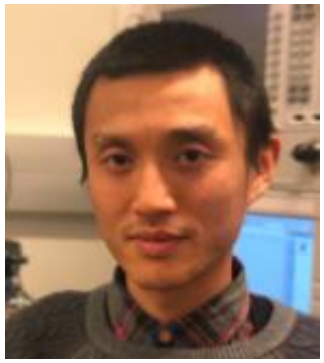

Unconventional superconductors that break time-reversal symmetry (TRS) hold great promise for both fundamental research and practical applications. We explore a unique approach to induce possible chiral superconductivity by introducing chiral molecules into two-dimensional superconductors TaS_2. By conducting phase-sensitive Little-Parks measurements, we found a half-flux quantum phase shift unique to chiral molecule-intercalated systems. We also observe the magnetic field-free superconducting diode effect below the superconducting transition temperature, suggesting spontaneous TRS breaking. Our study not only unravels the intriguing interplay between atomic and molecular layers but also opens exciting avenues for creating artificial quantum materials. By combining diverse layered crystals with a vast range of molecules, our approach may open up opportunities of harnessing unconventional superconductivity for future applications.

Dr. Zhong Wan is currently a postdoctoral research scholar at UCLA in the Department of Chemistry and Biochemistry, working with Prof. Xiangfeng Duan. Before joining UCLA, he earned his Ph.D. in condensed matter physics from Purdue University in 2018 under the guidance of Prof. Leonid Rokhinson. His research interests encompass quantum materials engineering, the development of nanoscale devices, and the exploration of emergent low-temperature quantum transport properties. Dr. Wan is the recipient of the 2020 Postdoctoral Research Award from the Department of Chemistry and Biochemistry and nominee of the 2021 Chancellor's Award for Postdoctoral Research at UCLA.

Friday, January 12 at 4:00PM
4-330 PAB