北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Special Seminar

Recent progress on microwave-shielded ultracold fermionic polar molecules

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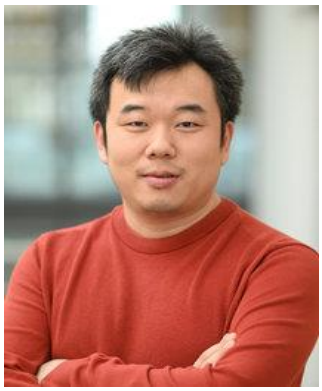

Time: 10:00 am, Aug. 12, 2024 (Monday)

时间：2024年8月12日 （周一）上午10:00

Venue: Room w563, Physics Building, Peking University

地点：北京大学物理楼，西563会议室

Abstract

Microwave-shielding has proven to be a powerful technique for producing degenerate quantum gases of polar molecules as well as assembling ultracold polyatomic molecules. Here, I will review our efforts in controlling the interactions of ultracold molecules using microwave fields, enabling us to stabilize the molecular gases and evaporate them to temperatures well below the Fermi temperature. The shape, symmetry, and depth of the intermolecular potential can be flexibly controlled by the polarization, strength, and frequency of the microwave field. This is a unique feature of microwave-shielded polar molecules that is distinguished from ultracold atoms. It allows us to observe field-linked resonances in collisions of polar molecules, providing a universal tool for independently controlling the dipolar and contact interactions of molecules, as well as creating exotic long-range tetratomic molecules. In the end, I will discuss the perspectives of a p-wave superfluid of dimers and its crossover to a Bose-Einstein condensate of tetramers.

About the speaker

Xin-Yu Luo is an independent research group leader at the Max-Planck-Institute for Quantum Optics. He has been focusing on experiments of quantum manipulation and precision measurements with ultracold atoms and polar molecules. His current research interest is to understand and control the collisions of ultracold polar molecules and, subsequently, investigate strongly interacting dipolar quantum many-body systems.