



Weekly Seminar

Many-Body States in Double Layer Quantum Hall Systems

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Time: 3:00 pm, April 8, 2026 (Wednesday)

时间: 2026年4月8日 (周三) 下午3:00

Venue: Room w563, Physics building, Peking University

地点: 北京大学物理楼, 西563会议室

Abstract

Quantum Hall systems host not only topological states but also symmetry breaking ones. Recent years have witnessed significant progresses in van der Waals heterostructures. It is possible to fabricate double layer systems with very small interlayer distance and a variety of energy bands. We study fractional quantum Hall states in double layer systems. When an electron is dressed by two fluxes from each layer to form composite fermions, they can form two types of composite fermion exciton condensates. In the first type ones, all effective levels are partially occupied and excitonic correlations are present between composite fermions in the same effective level. In the second type ones, composite fermions in the topmost effective levels of the two layers form exciton condensate whereas those in lower effective levels are independent. We demonstrate using numerical calculations that some composite fermion exciton condensates can be realized in microscopic models. For certain interlayer distance, there could be different intralayer and interlayer flux attachment patterns, and the system may form other two-component states. We discuss some subtle issues in the experimental identification of these states. If the single-particle eigenstates in the two layers are different, the system may form non-topological symmetry breaking states.

About the speaker

吴英海, 2009年本科毕业于中国科学技术大学近代物理系, 2014年博士毕业于美国宾夕法尼亚州立大学物理系, 导师为Jainendra Jain, 2014-2017年间在德国马普量子光学研究所J. Ignacio Cirac理论组从事博士后研究。2017年8月至今为华中科技大学物理学院副教授。主要研究方向为强关联量子多体系统, 已发表学术论文40余篇。