Weekly Seminar

Nanophotonics of microcavity exciton–polaritons

Zhanghai Chen

Xiamen University

Time: 3:00 pm, June.11, 2025 (Wednesday)

时间：2025年6月11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

The past 30 years have witnessed remarkable developments of microcavity exciton–polaritons, which have made a great impact on photonics and optoelectronics from fundamental physics to device applications. New materials and optical structures have been developed for novel polariton lasers for the sake of room temperature operation, flexible mode engineering, and high power efficiency. More powerful spectroscopic techniques have also promoted the understanding of polariton dynamics, coherence, nonlinearity, and topology. In this review talk, I will start with a brief introduction to the picture of polaritons, and various polariton systems based on different microcavity structures and semiconductor materials. Then, I will present several important spectroscopic techniques and numerical tools for characterizing polaritons experimentally and theoretically. Next, I will address the macroscopic quantum phenomena observed in the polariton systems and review the physics and applications of polariton nonlinearity. Moreover, I will highlight the new emerging fields of topological and non-Hermitian polaritons. In the end, I will conclude with the future perspectives of microcavity exciton–polaritons.

About the speaker

陈张海，物理学教授，厦门大学物理科学与技术学院院长，博士生导师，曾获中国物理学会黄昆物理奖、国家自然科学基金委杰出青年基金资助，上海市优秀学术带头人称号等。
陈张海长期从事半导体及其纳米结构的光谱特性研究，其研究兴趣包括：单个小量子体系中电子态、半导体纳腔中光与物质相互作用、固体环境中电子的量子混沌运动等。在Phys. Rev. Lett. 等重要国际学术期刊上发表论文 100余篇，相关研究成果获国内外同行的关注。