世纪物理情·系列讲座

Manipulating Room-Temperature Polariton Condensates and

Their Ultrafast Dynamics

【摘要】

In the past three decades, microcavity exciton polaritons (MEPs) have shown tremendous progress, manifested not only in intriguing macroscopic quantum phenomenon, such as Bose-Einstein condensation, superfluidity and vortex formation, but also in photonics and optoelectronics devices. The MEPs are quantum superpositions between excitons and microcavity photons, exhibiting unique "part-light part-matter" nature. They display extremely small effective mass and extremely fast propagation enabled by the strong nonlinear interactions derived from the excitonic components. Recent progress has pushed MEPs research towards operating at room-temperature, derived from a unique combination of materials traits, such as large exciton binding energy, large oscillator strength and high optical gain, in a few exceptional systems. This talk will present the recent progress in MEPs in halide perovskite semiconductor system, with a particular focus on artificial lattice potential landscape to manipulate the condensate, and their ultrafast dynamics driven by the strong nonlinear interactions. Outlooks on the integrated ultrafast polaritonic devices will be summarized to conclude the talk.

【报告人简介】



Qihua Xiong, Professor of Physics at Tsinghua University. He obtained his B.Sc. degree from Wuhan University in 1997 and Ph.D. degree from the Pennsylvania State University in 2006. He then pursued his postdoctoral fellow research at Harvard University in



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between 2006-2009. He joined Nanyang Technological University in 2009 as Nanyang Assistant Professor supported by Singapore National Research Foundation NRF Fellowship. He was tenured in 2014 and promoted to full professor in 2016. He relocated to Tsinghua University in the end of 2020. He was elected as a Fellow of American Physical Society in 2018, Fellow of Optical Society of America in 2021, and Fellow of Materials Research Society in 2022. He was awarded National Talent Program in 2017 and inaugural Singapore National Research Foundation NRF Investigatorship in 2014.

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