Manipulating exciton polariton condensate and propagation in perovskite microcavities

Qihua Xiong*
State Key Laboratory of Low-Dimensional Quantum Physics
Department of Physics, Tsinghua University
**E-mail: qihua_xiong@tsinghua.edu.cn*

Recently, microcavity exciton polariton research has attracted considerable interests in a number of excellent optical gain materials that demonstrate unique properties compared with conventional III-V or II-VI semiconductor quantum wells and organic semiconductors. Those materials include transition metal dichalcogenides (TMDs), and certain halide perovskite semiconductors. Particularly, those materials exhibit large exciton binding energies (much larger than thermal fluctuation energy ~ 26 meV), large oscillator strength and peculiar electronic band structures such as valley polarization or encoded chiroptical responses. In this talk, we will discuss our recent effort in manipulating exciton polariton condensates in halide perovskite semiconductors microcavities, for instance using artificial lattices to engineer the strong optical responses including topological properties, and their ultrafast propagation. Finally, we will briefly discuss the nonlinear optical properties in polariton condensate trapped in artificial potential landscapes, by a pump-probe transient spectroscopy at momentum space. Our results demonstrate a promising perspective of polaritonics in a wide range of ultrafast optical and photonic applications at room temperature.

References:

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