Contribution ID: **39** Type: **Contributed talk**

Bose-Einstein condensation and lasing of low-dimensional semiconductor materials

Wednesday, 4 September 2024 12:00 (20 minutes)

Exciton-polaritons are unique quasiparticles formed by the interaction of excitons and optical modes, offering promising applications in coherent light sources and optical control devices. Our presentation focuses on the observation of Bose-Einstein condensation of upper polariton branch in a WS2 monolayer microcavity. As the condensation threshold is reached, we note a nonlinear increase in upper polariton intensity, reduced linewidth, and enhanced temporal coherence, characteristic of the condensation phenomenon. Through simulations, we determine the specific particle density range necessary for this condensation based on excitonic properties and pumping conditions. This discovery opens avenues for exploring condensate competition and its practical use in polaritonic lasers. Additionally, we explore the potential of Van der Waals homostructures consisting of stacked WS2 layers for enhancing optical properties. Our experiments demonstrate ultra-low threshold laser emission from triple WS2 layers separated by hBN, indicating efficient laser operation possibilities with such structures.

References

Short bio (50 words) or link to website

https://faculty.ecnu.edu.cn/_s29/sz2_en/main.psp

Relevant publications (optional)

Career stage

Professor

Primary author: Prof. SUN, Zheng (East China Normal University)

Presenter: Prof. SUN, Zheng (East China Normal University)

Track Classification: FINESS