

Photoluminescence of Exciton Polariton Condensates at High Densities

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Exciton-polariton condensates need to be continuously pumped due to their short lifetime of the order of picoseconds. This open-dissipative nature of the system is particularly important in the high density regime, bringing new physics beyond traditional atomic BEC systems: the gain and loss of the condensate can no longer be ignored.

At high density, it has been a controversial issue of whether exciton-polariton BECs would undergo a crossover to photon lasing based on electron-hole plasma, or an electron-hole BCS-like phase [1-3]. In this work we discuss the property of the high density exciton-polariton BECs via two-time correlation function of an open system [4] taking into account of reservoir pumping and cavity, exciton loss. We consider a model where the lower polaritons are pumped into the condensate and decay with the finite lifetime. We also consider effects of a time dependent pump, which more closely simulates the experimental situation where a pulsed excitation is used.

References:

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