

Design and characterization of polariton microcavities

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It is now routine to use molecular beam epitaxy (MBE) of GaAs/AlGaAs/AlAs to produce microcavity structures for polaritons with lifetimes of hundreds of picoseconds, which allows thermal equilibrium, as well as strongly interacting, coherent polaritons at room temperature. I will discuss some of the "tricks" that are used by two MBE groups to make these structures successfully, as well as how to characterize them. Many coherent polariton effects, and Bose condensation, become much easier with these structures with long polariton lifetime.

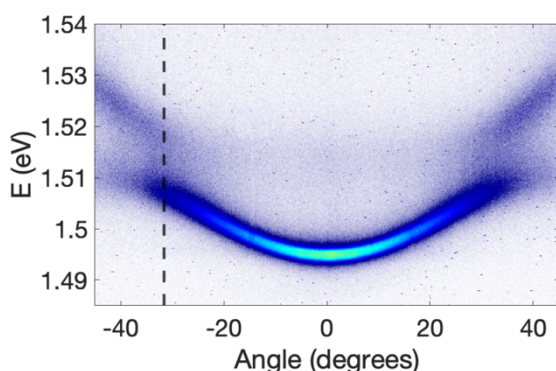


Figure 1. Experimentally measured dispersion of exciton-polaritons in a GaAs/AlGaAs structure at room temperature, showing anticrossing due to strong coupling. From Ref. [1].

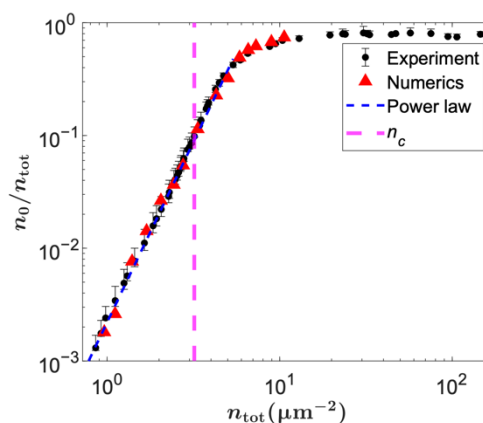


Figure 2. Coherent fraction (nominally, the "condensate" fraction) of polariton gas in a GaAs/AlGaAs structure at low temperature (~ 20 K), measured from interferometry, compared to numerical solution of Gross-Pitaevskii equation with infinite lifetime. From Ref. [2].

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References

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