

Multistability of exciton-polariton condensates resonantly excited in large mesas of a planar high-Q microcavity

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Abstract

The multistable behavior of 2D condensates of low-polaritons (LPs) resonantly excited in large square mesas of planar high-Q MCs with LP damping $g = 5$ meV is investigated. It is found that parametric scattering of LPs in mesas leads to the formation of an intermediate stability branch in the bistable 2D LP system under pumping in small regions of $\hbar\omega_p$ at the violet edges of optically active LP resonances E_{ij} . In this case, the positive feedback between the growth of $|y|^2$ and the blue shift of the nearest resonance E_{ij}^* leads to instability of the E_{ij}^* mode and its transition to the upper branch of the S-curve, but in a certain region of pump densities it is insufficient to cause instability of the entire condensate. Outside these regions, the LP system in a mesa, as in a planar MC, exhibits bistable behavior.