

Phase ordering kinetics of a nonequilibrium exciton-polariton condensate

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We investigate the process of coarsening via annihilation of vortex-antivortex pairs, following the quench to the condensate phase in a nonresonantly pumped polariton system. We analyze in detail two distinct cases, corresponding to shorter and longer polariton lifetime. In the case of a short polariton lifetime, we find that the late-time dynamics is a clean example of universal phase ordering kinetics, characterized by scaling of correlation functions in time. The evolution of the characteristic length scale $L(t)$ is the same as for the two-dimensional XY model, described by a power law with the dynamical exponent $z \approx 2$ and a logarithmic correction. In contrast, in the case of a long polariton lifetime, we obtain the exponent $z \approx 1$, which agrees with previous studies of conservative superfluids.