

Abstract Submitted
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Superfluid in a shaken optical lattice: quantum critical dynamics and topological defect engineering ANITA GAJ, LEI FENG, LOGAN W. CLARK, CHENG CHIN, University of Chicago — We present our recent studies of non-equilibrium dynamics in Bose-Einstein condensates using the shaken optical lattice. By increasing the shaking amplitude we observe a quantum phase transition from an ordinary superfluid to an effectively ferromagnetic superfluid composed of discrete domains with different quasi-momentum. We investigate the critical dynamics during which the domain structure and domain walls emerge. We demonstrate the use of a digital micromirror device to deterministically create desired domain structure. Using this technique we develop a clearer picture of the quantum critical dynamics at early times and its impact on the domain structure long after the transition.

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