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Driven-dissipative bosons in open boundary and inhomogeneous cavity arrays KHAN W. MAHMUD, University of Maryland, RYAN M. WILSON, United States Naval Academy, MICHAEL FOSS-FEIG, MOHAMMAD HAFEZI, University of Maryland — We study the driven-dissipative Bose-Hubbard model, which describes the physics of coherently pumped photonic cavity arrays as well as strongly interacting ultracold bosons in an optical lattice in a driven dissipative setting. We investigate many-body states and their quantum correlations on finite size lattices with open boundary conditions, a set up which is experimentally relevant. We show that the effects of hard boundaries on the steady-states are nontrivial, and explain the results in terms of finite system size excitations and the underlying phases of a thermodynamically large system. Furthermore, we explore the effects of trap inhomogeneity, such as an external harmonic trap, quantifying the breakdown of local density approximation for finite system size. We use a mixed state version of matrix product states algorithm for the numerical investigation.

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