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Critical Initial Slip Scaling for Driven-dissipative Bose-Einstein Condensation WEIGANG LIU, Department of Physics, Virginia Tech, UWE TAUBER TEAM — The universal critical behavior near the continuous non-equilibrium phase transition of driven-dissipative Bose gases is investigated employing the perturbative field-theoretic renormalization group method. Such criticality may be realized in a broad range of driven open systems on the interface of quantum optics and many-body physics, ranging from exciton–polariton condensates to cold atomic gases. The starting point is a noisy, dissipative Gross-Pitaevski equation corresponding to a complex-valued Landau-Ginzburg functional, which captures the near critical non-equilibrium dynamics, as well as a Gaussian weighted random initial state, which breaks time translation invariance. This setup generalizes the standard equilibrium Model A kinetics for classical relaxational dynamics with non-conserved order parameter. We study the universal critical behavior of this system in the early stages of the relaxation process, which is governed by an independent so-called initial-slip exponent. To one-loop order in the dimensional expansion about the upper critical dimension, this initial slip exponent is identical to its equilibrium counterpart. We argue that this remains likely true to all orders in the perturbation expansion. This research is supported by the U. S. Department of Energy, Office of Basic Energy Sciences, Division of Materials Science and Engineering under Award DE-FG02-09ER46613.

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