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Numerically Shaking Bosonic Condensates: Successes and Breakdowns of Floquet-Band Engineering BRANDON ANDERSON, LOGAN CLARK, James Franck Institute and University of Chicago, JENNIFER CRAWFORD, University of Florida, ANDREAS GLATZ, IGOR ARONSON, Argonne National Laboratory, PETER SCHERPELZ, University of Chicago, CHENG CHIN, KATHYRN LEVIN, James Franck Institute and University of Chicago — Here we numerically study homogeneous Bose condensates subjected to a periodically driven lattice, as was performed in recent experiments [1,2]. Making no assumptions about Floquet bandstructure, we show where and when lattice shaking leads to the domain formation anticipated by the Floquet picture. This occurs abruptly at a critical shaking amplitude and is consistent with a (dynamical) quantum critical phase transition. In the weak interaction limit, for fast and slow ramp rates, we find that the transition is second order and we present clear evidence for Kibble-Zurek scaling. Detailed comparison with recent experiments shows very good agreement [1,2]. [1] C. V. Parker, L.-C. Ha, C. Chin Nat. Phys. 9, 769-774 (2013) [2] L. W. Clark, L. Feng, C. Chin, Science 354, 6312 (2016)

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