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Routes to Quantum Vortex Nucleation ANDREAS NUNNENKAMP,
Yale University, ANA MARIA REY, JILA, NIST and Department of Physics, Uni-
versity of Colorado, Boulder, USA, KEITH BURNETT, University of Sheffield, UK
— We study and compare quantum vortex nucleation of a dilute ultracold bosonic
gas trapped in three different configurations: a one-dimensional ring lattice, a one-
dimensional ring superlattice and a two-dimensional asymmetric harmonic trap. In
all of them there is a critical rotation frequency, at which the ground state becomes
a fragmented Bose-Einstein condensate and is therefore highly entangled. However,
the entanglement properties vary significantly from case to case. We explain these
differences by characterizing the intermediate states that participate in the vortex
nucleation process. Finally, we show that noise correlations are sensitive to these
differences.

Andreas Nunnenkamp
Yale University

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