Abstract Submitted
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**Cat state production with ultracold bosons in rotating ring superlattices**[1] ANDREAS NUNNENKAMP[2], Clarendon Laboratory, University of Oxford, ANA MARIA REY, ITAMP, Harvard University, USA, KEITH BURNETT, University of Sheffield, UK — Ultracold bosons in rotating ring lattices have previously been shown to form cat-like superpositions of different quasi-momentum states. We demonstrate that cat state production in slightly non-uniform ring lattices has several advantages: the energy gap decreases less severely with the number of particles, the sensitivity to detunings from the critical rotation frequency is reduced, and the scheme is not limited to commensurate filling. We show that different quasi-momentum states can be distinguished in time-of-flight absorption imaging and propose to probe cat-like correlations via the many-body oscillations induced by a sudden change in the rotation frequency.

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