

Abstract Submitted  
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**Supercurrent decay in one-dimensional Bose gases in a ring optical lattice**<sup>1</sup> IPPEI DANSHITA, ANATOLI POLKOVNIKOV, Department of Physics, Boston University, Boston, MA 02215 — Applying the time-evolving block decimation method to the Bose-Hubbard model with a periodic boundary condition, we study the decay dynamics of supercurrents in one-dimensional lattice bosons. We show that while a supercurrent persists when the ratio of the onsite interaction  $U$  to the hopping  $J$  is sufficiently small, increasing  $U/J$  enhances quantum fluctuations and causes the decay of the supercurrent. In the case of commensurate filling, we find a coherent oscillation between certain momenta  $p$  and  $-p$  resulting from the decay instead of the relaxation to a zero momentum state. We also find that the double-phase slip, in which the winding number of the supercurrent suddenly changes from 1 to -1, occurs associated with this oscillation.

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