Supercurrent decay in one-dimensional Bose gases in a ring optical lattice\textsuperscript{1} 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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Ippei Danshita
Department of Physics, Boston University, Boston, MA 02215

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