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Quantum Phase Slip Localization on the Percolation Cluster Backbone[1] NOAH BRAY-ALI, Joint Quantum Institute, University of Maryland, College Park and National Insititute of Standards and Technology, Gaithersburg, MD 20899 — Quantum phase slips proliferate at the superfluid-to-Mott insulator transition of interacting lattice bosons with commensurate filling in one dimension. The backbone of the incipient infinite cluster at percolation threshold is topologically one-dimensional but localizes quantum phase slips. We calculate the quantum depletion of the condensate fraction on the percolation cluster for weak interactions. Finally we estimate the critical interaction strength where quantum phase slips delocalize using a strong-disorder renormalization group approach applied to the percolation backbone.

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