

Abstract Submitted
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Exploiting silicon chip technology for control of electrons on superfluid helium¹ F.R. BRADBURY, MAIKA TAKITA, Princeton University, KEVIN ENG, T.M. GURRIERI, K.J. WILKEL, Sandia National Lab, S.A. LYON, Princeton University — Electrons on the surface of superfluid helium have extremely high mobilities and long predicted spin coherence times, making them ideal mobile qubits. Previous work has shown that electrons localized in helium filled channels can be reliably transported between multiple underlying gates. Silicon chips have been designed, fabricated, and post processed by reactive ion etching to leverage the large scale integration capabilities of silicon technology. These chips, which serve as substrates for the electrons on helium research, utilize silicon CMOS for on-chip signal amplification and multiplexing and the uppermost metal layers for defining the helium channels and applying electrical potentials for moving the electrons. We will discuss experimental results for on-chip circuitry and clocked electron transport along etched channels.

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