Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Superconducting qubits on silicon substrates for quantum device integration ANDREW KELLER, MICHAEL FANG, PAUL DIETERLE, BRETT BERGER, OSKAR PAINTER, California Institute of Technology — We present a process for fabricating low-loss superconducting transmon qubits, using aluminum metallization on silicon and silicon-on-insulator substrates. The buried oxide in silicon-on-insulator substrates can be undercut by an HF vapor process compatible with the patterned aluminum features, in principle permitting optical waveguides and mechanical resonators to reside on the same chip as the qubits. We have characterized our qubits by pulsed time-domain measurements and find qubit lifetimes and coherence times comparable to those attainable on sapphire substrates. This suggests a route towards integrating qubits with quantum coherent microwave-to-optical transducers for quantum networking applications.

Andrew Keller
California Institute of Technology

Date submitted: 11 Nov 2016 Electronic form version 1.4