Abstract Submitted
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Coupling propagating acoustic waves to quantum circuits MARTIN GUSTAFSSON, Chalmers University of Technology, PAULO SANTOS, Paul-Drude-Institut fur Festkorperelektronik, GÖRAN JOHANSSON, PER DELSING, Chalmers University of Technology — We present a method for coupling propagating Surface Acoustic Waves (SAW) to charge sensitive quantum circuits, by direct piezoelectric charge induction. Using an RF-Single Electron Transistor[1] as a high-performance electrometer, and employing an on-chip mixing technique[2], we demonstrate ultra-high displacement sensitivity in the gigahertz frequency range, and an averaged detection sensitivity below the single-phonon level. Based on these experimental results, we discuss how the method can be enhanced and extended to superconducting qubits, and what roles Surface Acoustic Waves could potentially play in novel hybrid quantum devices.

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