

Acoustic resonator for superconducting qubits

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In this work we have shown two different ways to fabricate acoustic resonators and we have presented measurement results. Process ARP-Titanium-ARP and Aluminium-etching process have their advantages. Aluminium-etching process is much shorter and quicker, but ARP-Titanium-ARP process is more temperature stable. One of the main purpose of acoustic resonators's creation is to use it for interaction qubit-resonator implementation. We can calculate coupling and this way we can reach coupling coefficient g value of 30MHZ. The linewidth for the resonator is approximately 21 kHz. Because of this we can drive a qubit via a resonator and measure qubit characteristics, and also we can use an acoustic resonator to create and implement quantum gate. In addition geometric size of an acoustic resonator is much smaller, than QED devices.

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[1]Aref T. et al. Quantum Acoustics with Surface Acoustic Waves //Superconducting Devices in Quantum Optics. – Springer International Publishing, 2016. – C. 217-244.