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Surface acoustic wave resonators in the quantum regime RICCARDO MANENTI, MICHAEL PETERER, ANI NERSISYAN, EINAR MAGNUSSON, ANDREW PATTERSON, PETER LEEK, University of Oxford — Surface acoustic waves (SAWs) are mechanical modes confined to the surface of a piezoelectric crystal that can be excited and detected by electric circuits. These mechanical waves can be trapped between two reflectors producing a SAW resonator. In this talk, I will present an experimental study of SAW resonators at 10 mK [1], in which we find that internal quality factors Q_i approaching 0.5 million can be reached at 0.5 GHz and that $Q_i > 10^4$ is achievable above 4 GHz, making SAW resonators promising devices for integration into quantum circuits. I will discuss the loss mechanisms that may be currently limiting these Q-factors, and report on our progress towards coupling these mechanical resonators to superconducting qubits. [1] R. Manenti et al., arXiv:1510.04965

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