

Phonon traps to reduce the Quasiparticle density in superconducting circuits

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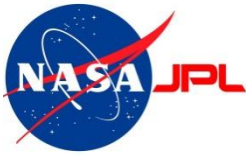
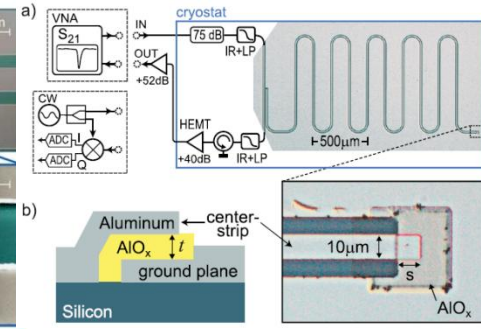
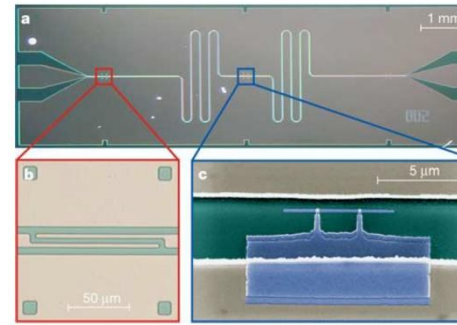
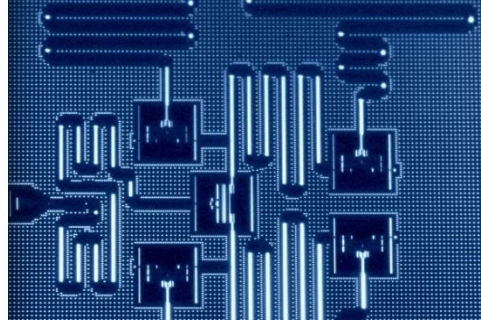
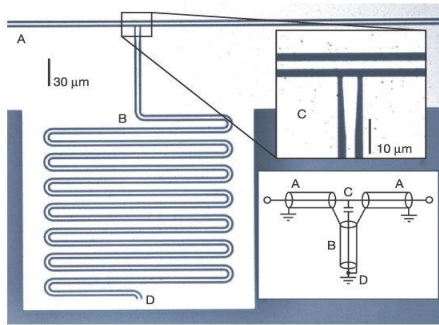


SPEED TALK MT Meeting 2019, JENA

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Superconducting resonators

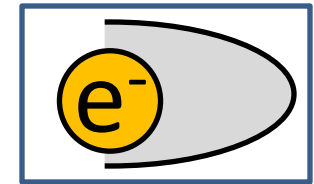
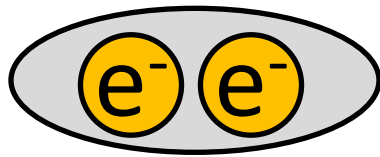
Astrophysics Quantum computing Quantum optics Materials science



ETH zürich

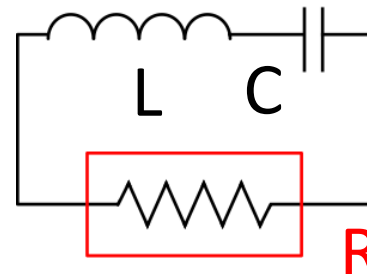


Superconductivity: electrons travel “in pairs” => $R = 0$



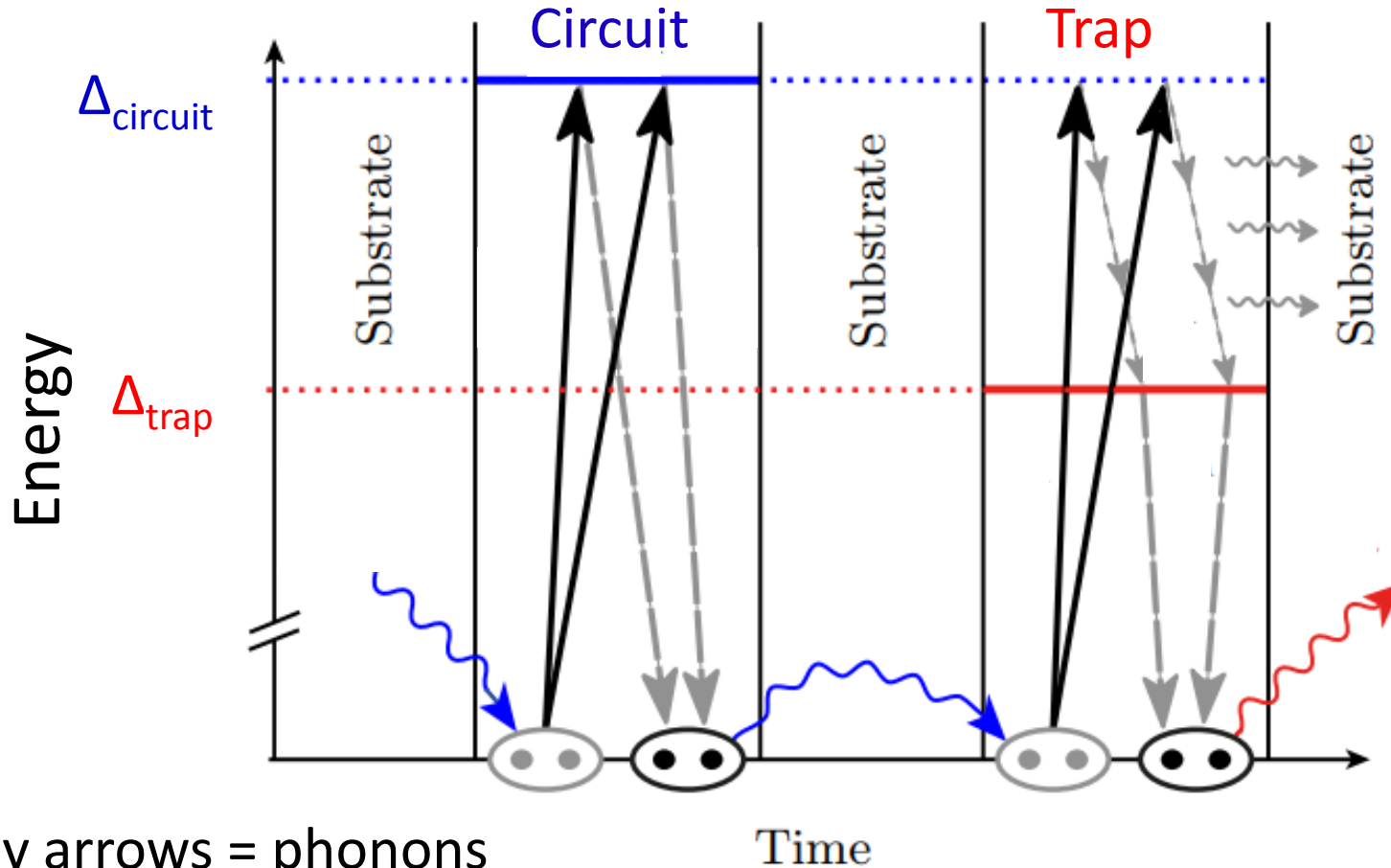
QPs reduce the performance of superconducting resonators

Pairs can break into two quasiparticles (QPs) => $R > 0$



$$Q_i^{-1} = \omega_0 R C$$

Phonon trapping



wiggly arrows = phonons

Valenti et al,
arXiv 1810:12341

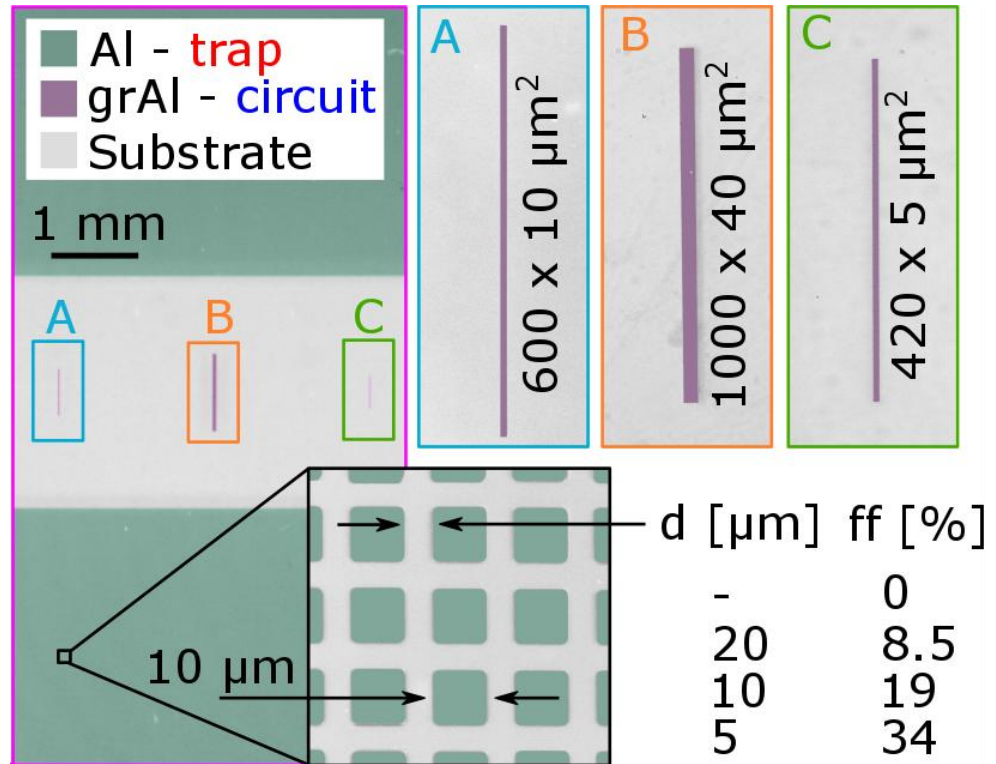
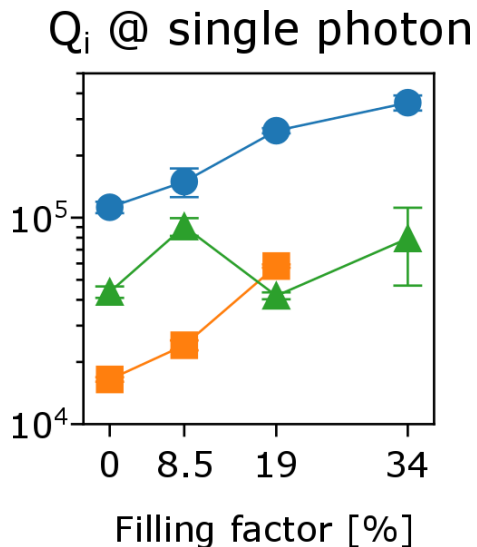
Phonon traps reduce the QP density

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Implementation and results

Resonators **A**, **B**, **C** :
striplines

Filling factor (ff) $\Leftrightarrow$
trapping efficiency



**Phonon traps increase the
performance of
superconducting resonators**