Abstract Submitted
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Relaxation mechanisms of the fluxonium qubit[1] NICHOLAS MASLUK, ARCHANA KAMAL, Yale University, VLADIMIR MANUCHARYAN, Yale University, Harvard University, JENS KOCH, Northwestern University, LEONID GLAZMAN, MICHEL DEVORET, Yale University — Fluxonium is a highly anharmonic artificial atom, which utilizes an inductance formed by an array of large Josephson junctions to shunt the junction of a Cooper-pair box. The first excited state transition frequency is widely tunable with flux, yet can be read out over the entire five octave range due to interactions of the 2nd excited state with the readout cavity, enabling a dispersive readout. We present T1 times of several fluxonium samples over the full range of flux dependent transition energies. By mapping out the qubit lifetimes we are able to distinguish between the contributions due to the Purcell effect and quantify dissipation internal to the qubit. With this understanding, we can design a qubit with minimized contribution from internal losses, which should push lifetimes further into the tens of microseconds. [1] V. E. Manucharyan et al., Science 326, 113 (2009).

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