Effective $\cos n\varphi$ Josephson element$^1$ W.C. SMITH, A. KOU, U. VOOL, L. FRUNZIO, M.H. DEVORET, Department of Applied Physics, Yale University — Using superinductances, one can realize circuit elements with tunneling energies proportional to $\cos n\varphi$, with $\varphi$ being the phase across the element and $n$ being a positive integer. In these elements, Cooper pairs are only able to tunnel in multiples of $n$, resulting in an $n$-fold degenerate ground state manifold that can encode a qubit. Such a qubit is expected to be insensitive to most relevant noise sources [1,2]. We present the experimental realization of a qubit based on the $\cos 2\varphi$ element and show preliminary measurements of its energy levels.


$^1$Work supported by: ARO, ONR, AFOSR and YINQE