

Abstract Submitted  
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**Improved JPC performance via a low inductance, lumped element design**<sup>1</sup> A. NARLA, K. SLIWA, M. HATRIDGE, S. SHANKAR, F. SCHACKERT, B. ABDO, L. FRUNZIO, R.J. SCHOELKOPF, M.H. DEVORET, Applied Physics Department, Yale University — The Josephson Parametric Converter (JPC), a linear, non-degenerate, nearly quantum-limited amplifier, is a promising tool for quantum information applications. We propose a new JPC design characterized by the use of multi-pF parallel-plate capacitors. By decreasing the geometric inductance of the system, higher critical-current Josephson junctions can be used. Both the bandwidth and dynamic range can thus be increased by a factor of two relative to existing microstrip devices. When integrated with a shunted ring of Josephson junctions [1], these devices should also be tunable over more than a GHz. We present simulations of the circuit behavior and preliminary measurements of a proof-of-concept device.

[1] N. Roch et al., Phys. Rev. Lett. 108, 147701, 2012

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