

Abstract Submitted  
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**Hybrid-free Josephson Parametric Converter**<sup>1</sup> N.E. FRATTINI, A. NARLA, K.M. SLIWA, S. SHANKAR, M. HATRIDGE, M.H. DEVORET, Department of Applied Physics, Yale University — A necessary component for any quantum computation architecture is the ability to perform efficient quantum operations. In the microwave regime of superconducting qubits, these quantum-limited operations can be realized with a non-degenerate Josephson junction based three-wave mixer, the Josephson Parametric Converter (JPC). Currently, the quantum signal of interest must pass through a lossy 180 degree hybrid to be presented as a differential drive to the JPC. This hybrid therefore places a limit on the quantum efficiency of the system and also increases the device footprint. We present a new design for the JPC eliminating the need for any external hybrid. We also show that this design has nominally identical performance to the conventional JPC.

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