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Simplifying the circuit of Josephson parametric converters
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KEEFE, IBM- Research Center — Josephson parametric converters (JPCs) are
quantum-limited three-wave mixing devices that can play various important roles in
quantum information processing in the microwave domain, including amplification
of quantum signals, transduction of quantum information, remote entanglement of
qubits, nonreciprocal amplification, and circulation of signals [1-4]. However, the
input-output and biasing circuit of a state-of-the-art JPC consists of bulky com-
ponents, i.e. two commercial off-chip broadband 180-degree hybrids, four phase-
matched short coax cables, and one superconducting magnetic coil. Such bulky
hardware significantly hinders the integration of JPCs in scalable quantum comput-
ing architectures. In my talk, I will present ideas on how to simplify the JPC circuit
and show preliminary experimental results. [1] B. Abdo et al., PRB 87, 014508. [2]
M. Silveri et al., arxiv:1507.00732. [3] B. Abdo et al., PRL 112, 167701. [4] K. Sliwa
et al., arxiv:1503.00209.

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