

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Demonstrating a gyrator operation using Josephson mixers

BALEEGH ABDO, NICK BRONN, OBLESH JINKA, MARKUS BRINK, JERRY CHOW, IBM T J Watson Research Center — A gyrator is a two-port microwave component that has a 180 degree differential phase shift between waves propagating through it in opposite directions [1]. In this work, we present a proof-of-principle gyrator that does not employ ferrites or permanent magnets and is based instead, on unitary Josephson mixers [2]. We show that such a gyrator can be a key component in the realization of circulators on chip capable of routing microwave signals to and from superconducting qubits and parametric amplifiers in scalable quantum processors. Such on-chip circulators are particularly needed for scalable architectures to where existing state-of-the-art, off-chip, commercial, cryogenic circulators used nowadays might be disadvantaged. We discuss possible improvements to the device performance and how it can be used to realize practical on-chip circulators. [1] D. M. Pozar, Microwave Engineering. [2] B. Abdo et al., PRB 87, 014508.

Baleegh Abdo
IBM T J Watson Research Center

Date submitted: 11 Nov 2016

Electronic form version 1.4