# Abstracts

## An Efficient Self-Oscillating Mixer for Communications

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The optical control of the distributed electronics in phased array antennas requires specialized circuits which are compatible with the T/R level data mixing architecture. This paper presents a novel circuit, a push-pull self-oscillating mixer, that can provide the following important advantages: 1) very stable free running oscillation and low FM noise without using a frequency stabilizing dielectric resonator; 2) large subharmonic injection locking range; 3) high frequency conversion efficiency; and 4) low noise figure for the self-oscillating mixer. This proposed circuit efficiently oscillates and mixes with a low prime power consumption. A circuit topology based on this concept was analyzed and designed at 12 GHz using a MESFET pair. Efficient subharmonic injection locking was demonstrated by selecting the optimum operating point corresponding to efficient mixing. The measured down-conversion gain was as high as 13 dB with a double sideband noise figure of 8 dB. This topology can be directly applied for MMIC applications.

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