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【823】 Gate-tunable, superconductor-semiconductor parametric amplifier

We have built a parametric amplifier with a Josephson field effect transistor (JoFET) as the active element inside a half-wave transmission line resonator. The JoFET has been made from an aluminum-indium arsenide superconductor-semiconductor heterostructure with a controlling top gate. The device's resonant frequency is field-effect tunable over a range of 2 GHz. The JoFET amplifier has 20 dB of gain, 4 MHz of instantaneous bandwidth, and a 1 dB compression point of -125.5 dBm when operated at a fixed resonance frequency.

Theoretical Work

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