

Abstract Submitted
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Ground Capacitance in Josephson Junction Arrays¹ ZLATKO MINEV, IOAN POP, NICHOLAS MASLUK, ARCHANA KAMAL, MICHEL DEVORET, Yale University, QLAB — Josephson junction arrays (JJAs) have gained popularity in modern experiments. They find employment as high impedance “superinductance” elements in fluxonium type qubits [Manucharyan et al. Science 326, 113 (2009)] or in the study of Bloch oscillation. However this high impedance behavior is limited at high frequencies by the junction array capacitance to ground. We investigate the dependence of JJAs impedance on frequency. The JJA behaves as a linear inductance for frequencies sufficiently below the array self resonance. The maximum number of junctions in the array is thus limited by the ground capacitance. We study the dependence of the ground capacitance of JJAs on their geometry, and extract general design principles which will reduce this parasitic coupling and maximize the number of junctions in the superinductance.

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