

Abstract Submitted
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Tunable plasma edge in Josephson junction loaded wire array metamaterial¹ MELISSA TREPANIER, DAIMENG ZHANG, University of Maryland, College Park, V. P. KOSHELETS, IREE, STEVEN ANLAGE, University of Maryland, College Park — It is desirable to have a tunable negative permittivity medium that operates in the microwave domain. The effective plasma frequency of a JJ-loaded wire array can be tuned as a function of dc current and temperature in the low current limit. To demonstrate this effect we observe a change in transmission through a single layer of 8 superconducting Nb wires that spans a rectangular waveguide. A simple model that treats the wires as an artificial dielectric with a tunable effective permittivity shows good agreement with measured results for tuning of the plasma edge. In addition we have observed interesting behavior at higher current and rf input power. The dynamics are very rich, highly hysteretic, and nonlinear.

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