

Abstract Submitted  
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**Simulation of a distributed current source in a linear format CFA<sup>1</sup>**

MARCUS PEARLMAN, JIM BROWNING, Boise State University — A fundamental limit on Crossed-Field Amplifiers (CFA) gain is beam to RF power ratio. With too much beam power, the RF signal on the slow wave circuit is “swamped.” It is proposed here that a controllable, distributed cathode source can be used to tailor current injection and optimize gain. In this work a linear format CFA with a meander line slow wave circuit is tested experimentally and numerically using Vsim. Simulations of the original design, which operates at 900 MHz, shows < 1dB gain at beam currents >100 mA. This beam current is higher than the capabilities of the Field Emitter Array cathodes available to the group; therefore no experimental gain was observed. To be able to compare simulation to experiment, the CFA model under study was changed to the experiment used at Northeastern University in 1991, which also uses a meander line circuit and an injected beam configuration. Direct comparisons between the simulation and this experiment are performed to validate the model. Additional simulations study the effect of different current distributions on gain, bandwidth, and efficiency. Practical considerations such as how to control the energy of the beam separately from the sole potential in order to minimize lost current to sole are also examined.

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