Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Computational and Experimental Development of a Linear Cross-Field Amplifier[1] JOHN WATROUS, NumerEx, LLC, JIM BROWNING, MARCUS PEARLMAN, Department of Electrical and Computer Engineering, Boise State University — A linear crossed-field amplifier (CFA) is being developed by combining high-performance modeling, reduced physics models, and experiments. A prior CFA design showed no gain; models of the device suggested that the meander line produced strong standing and backward waves that frustrated the interaction with the electron beam. Calculations using the AFRL PIC code, ICEPIC, examined the meander line fields and their interaction with the electron beam, suggesting that increasing the distance between sole plate and meander line would reduce the influence of the standing and backward waves; calculations of a modified CFA showed improvements in behavior. Work focuses on analysis of the fields produced by the meander line. Reduced physics models point to regions in the parameter space defined by meander line and beam currents where useful interaction occurs. Promising regions will be explored in ICEPIC calculations. In the lab, the meander line circuit is being rebuilt to reduce the role of the standing and backward waves. Initial experiments will use field emitters in an injected beam configuration, but these will be replaced with a distributed array of controllable field emitters with the long-term goal of exploiting the control of the emission process to optimize the gain.

[1]Work supported by Air Force Office of Scientific Research.

John Watrous
NumerEx, LLC

Date submitted: 09 Jul 2012 Electronic form version 1.4