

Abstract Submitted  
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**Multi-MW Output from the Recirculating Planar Crossed-Field Amplifier**<sup>1</sup> STEVEN EXELBY, NICHOLAS JORDAN, DREW PACKARD, YUE YING LAU, RONALD GILGENBACH, University of Michigan, BRAD HOFF, DAVID SIMON, Air Force Research Laboratory, UNIVERSITY OF MICHIGAN TEAM — Amplification to peak output powers up to 5-6 MW with approximately 9 dB gain has been demonstrated on the Recirculating Planar Crossed-Field Amplifier (RPCFA), with input of 100's kW, S-band microwave signals. The RPCFA is based on the Recirculating Planar Magnetron [1], which has been the focus of research at the University of Michigan. The performance of the RPCFA was predicted in simulation using the particle-in-cell code MAGIC [2], and the finite element frequency domain code ANSYS HFSS. Experiments on a prototype RPCFA showed generally good agreement with simulation. The device demonstrated zero drive stability, and approximately 15% bandwidth over the range of design frequencies, 2.63 to 3.05 GHz. Amplification was observed at input RF drive powers below 150 kW, however, the amplification gain in this regime was highly variable ( $\sigma = 2.74$  dB). Increasing the input signal power beyond 150 kW dramatically decreases the variability of gain ( $\sigma = 0.69$  dB). The peak output power in this experiment is limited by RF breakdown of the structure. Future experiments will be focused on extending the peak power and bandwidth generated by RPCFAs. [1] R.M. Gilgenbach, Y.Y. Lau, D.M. French, B.W. Hoff, J. Luginsland, and M. Franzl, "Crossed field device," U.S. Patent US 8 841 867B2, Sep. 23, 2014. [2] Developed by Alliant Techsystems

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Steven Exelby  
University of Michigan

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