

Abstract Submitted  
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**Harmonic Generation in the Multifrequency Recirculating Planar Magnetron**<sup>1</sup> S.C. EXELBY, G.B. GREENING, N.M. JORDAN, D. SIMON, P. ZHANG, Y.Y. LAU, R.M. GILGENBACH, Univ of Michigan - Ann Arbor — The Multifrequency Recirculating Planar Magnetron (MFRPM) is a high power microwave source adapted from the Recirculating Planar Magnetron<sup>a</sup>, currently under investigation at the University of Michigan. The device features 2 dissimilar periodic structures allowing for the generation of (L-band) 1- and (S-band) 2-GHz high power microwave pulses simultaneously. These distinct frequencies offer the potential for variable coupling for defense applications, such as counter-IED. Experiments have been performed on the RPM, driven by the Michigan Electron Long Beam Accelerator with a Ceramic insulator (MELBA-C) using a -300kV, 1-10 kA, 0.3-1.0 us pulse applied to the cathode. Using the Mode Control Cathode<sup>b</sup> and a coax-to-waveguide extraction system, the MFRPM has demonstrated simultaneous production of 20 MW at 1 GHz and 10 MW at 2 GHz. The L-band oscillator also produced both 2- and 4-GHz oscillations when the S-band oscillator turns on. These harmonics persist after the S-band oscillator turns off. Ongoing work will attempt to isolate these harmonics to measure the power accurately and confirm these observations. [a] R.M. Gilgenbach, Y.Y. Lau, D.M. French, B.W. Hoff, J. Luginsland, and M. Franzi, “Crossed field device,” U.S. Patent US 8 841 867B2, Sep. 23, 2014. [b] M.A. Franzi, R.M. Gilgenbach, Y.Y. Lau, B.W. Hoff, G. Greening, and P. Zhang, Phys. Plasmas 20, 033108 (2013).

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