

Abstract Submitted
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Recirculating Planar Magnetron Modeling and Experiments¹

MATTHEW FRANZI, RONALD GILGENBACH, University of Michigan, BRAD HOFF, DAVE FRENCH, Air Force Research Laboratory, Y.Y. LAU, University of Michigan — We present simulations and initial experimental results of a new class of crossed field device: Recirculating Planar Magnetrons (RPM) [1]. Two geometries of RPM are being explored: 1) Dual planar-magnetrons connected by a recirculating section with axial magnetic field and transverse electric field, and 2) Planar cathode and anode-cavity rings with radial magnetic field and axial electric field. These RPMs have numerous advantages for high power microwave generation by virtue of larger area cathodes and anodes. The axial B-field RPM can be configured in either the conventional or inverted (faster startup) configuration. Two and three-dimensional EM PIC simulations show rapid electron spoke formation and microwave oscillation in pi-mode. Smoothbore prototype axial-B RPM experiments are underway using the MELBA accelerator at parameters of -300 kV, 1-20 kA and pulselengths of 0.5-1 microsecond. Implementation and operation of the first RPM slow wave structure, operating at 1GHz, will be discussed.

[1] Patent pending

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Matthew Franzi
University of Michigan

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