

RECIRCULATING PLANAR MAGNETRONS FOR HPM AND MILLIMETER-WAVE GENERATION

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The Recirculating Planar Magnetron (RPM) [1] represents a revolutionary new class of crossed-field device that combines the advantages of high-efficiency recirculating devices with those of planar devices: both large-area cathode (high current) and anode (improved thermal management). This provides capabilities for both high power microwave and high frequency millimeter wave generation. Two UM RPM embodiments are modeled and under design:

- 1) Axial magnetic field with radial electric field (Fig. 1) and
- 2) Radial magnetic field and axial electric field (Fig. 2).

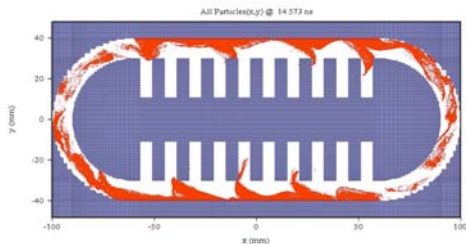


Figure 1. MAGIC code simulation of Recirculating Planar Magnetron with axial magnetic field and radial electric field (inverted configuration).

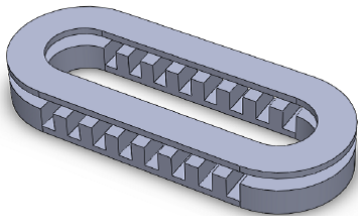


Figure 2. Racetrack Recirculating Planar Magnetron with radial magnetic field and axial electric field.

Simulation results (Fig. 1) show rapid (~10 ns) electron spoke formation and strong pi-mode oscillation at 3.2 GHz. Simulations and experimental plans will be presented for various RPM designs and output extractors.

1) R.M. Gilgenbach, Y.Y. Lau, B.W. Hoff, D.M. French, and J.W. Luginsland, "Crossed Field Device", Patent Pending, 2009

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