Abstract Submitted
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Magnetic Priming of a Relativistic Magnetron[1] B.W. HOFF, R.M. GILGENBACH, W.M. WHITE, N. JORDAN, R. EDGAR, Y.Y. LAU, V.B. NECULAES, M.C. JONES, P. PENGVANICH, University of Michigan, Ann Arbor, T.A. SPENCER, AFRL, Kirtland, NM, D. PRICE, Titan Corp., CA — Magnetic priming utilizes N/2 azimuthal variations in the axial magnetic field of an N-cavity magnetron to prebunch N/2 spokes for π-mode. [1] Positive results have been obtained in magnetic priming of the UM/Titan, relativistic magnetron (-300kV, 2-10kA, 0.3-0.5μs). Priming fields were created by three, axial, mu-metal wires within the cathode. Modeled magnetic field data were imported into 3-D MAGIC PIC and run for the A6 relativistic magnetron. Simulations showed faster startup and enhanced pi-mode control compared to the unprimed baseline. Initial experiments were performed in the UM/Titan magnetron with 3, 4 cm-long mu-metal wires embedded in the cathode, centered beneath the emission region. This primed magnetron yielded increased π-mode shots (57% primed vs. 35% unprimed) and statistically significant decreases in startup time (114 ns primed vs. 156 ns unprimed) and time to peak power (241 ns primed vs. 277 ns unprimed); mean peak power increased (11 MW primed vs. 6.5 MW unprimed, measured from 1 of 3 outputs). Additional concepts include longer cathode wires and wires in the anode. [1] V.B. Neculaes, R.M. Gilgenbach and Y.Y. Lau, US Patents 6,872,929 and 6,921,890

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