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Effect of Cathode Alignment on Magnetron Operation SARITA PRASAD, MARVIN ROYBAL, C. JERALD BUCHENAUER, Dept. of Electrical and Computer Engineering, University of New Mexico, KENNETH PRESTWICH, MIKHAIL FUKS, EDL SCHAMILOGLU, Dept. of Electrical and Computer Engineering, University of New Mexico — Recently, relativistic magnetron experiments were conducted at the University of New Mexico (UNM) to demonstrate the effect of using a transparent cathode on magnetron operation. We fabricated an A6 magnetron at UNM and during the procedure the magnetron got distorted and the result is a slightly elliptical cross-section magnetron. Consequently, the anode-cathode (AK) gap is not uniform. Magnetron operation is known to be sensitive to RF field distribution in the interaction region, which in turn is sensitive to the AK gap. Despite the asymmetry the transparent cathode was still capable of showing overall improvement in magnetron operation, i.e. faster start of microwave oscillations, higher output powers and single mode operation over a wide range of magnetic field. Interestingly, the magnetron operated in the π-mode instead of the expected 2π-mode. The solid cathode on the other hand showed mode competition and produced very low output powers. The elliptical magnetron geometry was studied using the 3-dimensional particle-in-cell code MAGIC in order to explain the experimental results.

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