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Impact of AK gap plasma on magnetron performance J.W. LUGINSLAND, J.J. WATROUS, NumerEx, Y.Y. LAU, University of Michigan, K.L. CARTWRIGHT, M.D. HAWORTH, Air Force Research Laboratory — A magnetron is a cross-field source of high power microwaves. While magnetrons consistently produces very high peak power [1], the source suffers from rather poor pulse length. Previous work [2] posited the existence of neutral moving cathode plasma with sufficient density to short out the electric fields in the device, acting as a kind of moving AK gap which de-tunes the device, changed the mode of operation, and/or caused a lack of insulation sufficient to terminate the output microwave power pulse. The challenge with this model is the basis of the plasma with sufficient density to short out the electric field. In this work, we report on recent developments [3] showing that plasma, anywhere in the anode-cathode gap, is sufficient to modify the electron flow hub height. The modification of the hub height is sufficient to break the Buneman-Hartree resonance condition and drastically reduce the efficiency of microwave production. The density of the ion population, while important for the degree of hub modification, need not short out the electric field in the diode. We will show 2D EM ICEPIC calculations of this novel pulse-shortening effect, comparing the simulation data with both theoretical and experimental results. Plausible schemes for the ion source will be discussed. [1] M. R. Lopez et. al., IEEE Trans. Plasma Sci, 30, 3, 947, 2002. [2] D. Price, J.S. Levine, and J.N. Benford. IEEE Trans. Plasma Sci. 26, 348, 1998. [3] Lau et. al. at this conference.

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