

Abstract Submitted
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Equilibrium and Stability of the Brillouin Flow in Recirculating Planar Magnetron¹ D.H. SIMON, Y.Y. LAU, M. FRANZI, G. GREENING, R.M. GILGENBACH, University of Michigan, Ann Arbor, MI, J.W. LUGINSLAND, AFOSR, Arlington, VA — Simulation of the novel recirculating planar magnetron, RPM [1], has shown rapid formation of electron bunches in the inverted magnetron configuration. This bunching mechanism was recently simulated in a thin electron layer model [2], which exhibited negative, positive, and infinite mass behavior, depending on the magnitude and sign of the radial electric field. We analyze these properties for the relativistic, cylindrical Brillouin flow, to evaluate RPM startup. We make use of our recent discovery that the electrostatic potential and the vector potential satisfy a Buneman-Hartree like relation, and a Hull-cutoff like relation EVERYWHERE within the equilibrium Brillouin flow.

[1] R. M. Gilgenbach, et.al., IEEE Trans. Plasma Sci. 39, 980 (2011).

[2] D. M. French, et al., Appl. Phys. Lett. 97, 111501 (2010).

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