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Brillouin Flow in Recirculating Planar Magnetron[1] D.H. SIMON, Y.Y. LAU, M. FRANZI, G. GREENING, R.M. GILGENBACH, University of Michigan — We examine the Brillouin flow in the conventional magnetron, inverted magnetron, and planar magnetron, with respect to the equilibrium, stability, and operating conditions. This renewed interest was prompted by our recent invention of the recirculating planar magnetron (RPM) [1], where rapid start up utilizes the negative mass instability in the inverted magnetron configuration [2]. Given that Brillouin flow is the most likely state in a crossed-field gap, and that various embodiments of the RPM consist of the conventional, inverted, and planar magnetron, it is necessary to study equilibrium, stability, and operating conditions at the same footing. To study startup, we solve the eigenvalue problem that governs the stability of Brillouin flow, including the effects of the resonant cavities that form the slow wave structures.

[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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