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Vortex structures in planar magnetrons[1] JOHN DAVIES, CHIPING CHEN, MIT Plasma Science and Fusion Center — In recent theoretical work, we proved the existence of vortex flows in the electron beam equilibria of magnetron structures consisting of a central cylindrical cathode and a periodically corrugated cylindrical anode [J. A. Davies and C. Chen, Phys. Plasmas 13, 012310 (2006)]. While the previous treatment was non-relativistic, the present theoretical work focuses on the relativistic regime. An analogous geometry for which a relativistic treatment is relatively simple is that of a planar cathode and a periodically corrugated planar anode. We will present results of vortex analyses in both the non-relativistic regime and the relativistic regime, and discuss the implications of our theoretical predictions.

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