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Simulation of a plasmoid penetrating a magnetic barrier[1] HERBERT GUNELL, J.J. WALKER, West Virginia University, T. HURTIG, Swedish Defence Research Agency, M.E. KOEPKE, WVU, N. BRENNING, Royal Institute of Technology, Sweden, H. NILSSON, Swedish Institute of Space Physics — Perturbed currents perpendicular to the magnetic field are generated by plasma motions in which the equilibrium magnetic field (and the corresponding equilibrium currents) are compressed, stretched, and deformed. One example of this is the Earth's magnetopause with its ever-present equilibrium transverse currents and its strong perturbations. Experiments have recently been performed using a plasma cannon to shoot a plasma at a magnetic barrier (Brenning, et al., PoP, 2005). Simulations of the above scenario for different values of the plasma density have reproduced experimentally observed lower hybrid frequency oscillations (Gunell, et al., Plasma Phys. Control. Fusion, 2008). We present simulations of plasmoids that are longer than those previously published and run over longer periods of time. New findings are waves propagating upstream from the barrier, and also that the penetration process causes the part of the plasmoid that is upstream of the barrier to rotate.

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