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Construction of a Plasma Dynamo Prototype ANDREW SELTZMAN[1], Georgia Institute of Technology, CARY FOREST, ROCH KENDRICK, CAMI COLLINS, University of Wisconsin-Madison — A new plasma experiment to investigate the self-generation of magnetic fields has been proposed. Here, a prototype experiment is described which plans to verify the concept of inducing the rotation of a nearly magnetic field free plasma (confined at the boundary by a highly localized multicusp magnetic field). The experiment consists of a cylindrical vacuum chamber with a series of insulated permanent magnet rings in a cusp geometry (poles facing inward with alternating polarity along the walls and end caps of the cylinder). The resulting field is axisymmetric and decays quickly away from the walls. Metal electrodes positioned between the magnet rings are biased such that the resulting electric field induces plasma rotation through the ExB drift. The principle is quite general and by controlling the poloidal profile of the toroidal rotation, high magnetic Reynolds number plasmas flows can be generated that result in magnetic field self-generation or plasma flows unstable to the magnetorotational instabilty.

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