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Optimization of the Magnetic Field Structure for Sustained Plasma Gun Helicity Injection for Magnetic Turbulence Studies at the Bryn Mawr Plasma Laboratory C. A. CARTAGENA-SANCHEZ, D. A. SCHAFFNER, H. K. JOHNSON, L. E. FAHIM, Bryn Mawr College — A long-pulsed magnetic coaxial plasma gun is being implemented and characterized at the Bryn Mawr Plasma Laboratory (BMPL). A cold cathode discharged between the cylindrical electrodes generates and launches plasma into a 24cm diameter, 2m long chamber. Three separately pulsed magnetic coils are carefully positioned to generate radial magnetic field between the electrodes at the gun edge in order to provide stuffing field. Magnetic helicity is continuously injected into the flux-conserving vacuum chamber in a process akin to sustained slow-formation of spheromaks. The aim of this source, however, is to supply long pulses of turbulent magnetized plasma for measurement rather than for sustained spheromak production. The work shown here details the optimization of the magnetic field structure for this sustained helicity injection.

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