Abstract Submitted
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Design of a Compact Coaxial Magnetized Plasma Gun for Magnetic Bubble Expansion Experiments[1] YUE ZHANG, ALAN G. LYNN, University of New Mexico, SCOTT C. HSU, HUI LI, WEI LIU, Los Alamos National Laboratory, MARK GILMORE, CHRISTOPHER WATTS, University of New Mexico — We will discuss the design of a compact coaxial magnetized plasma gun and its associated hardware systems in detail. The plasma gun will be used for experimental studies of magnetic bubble expansion into a lower pressure background plasma, as a model for extragalactic radio lobes. The gun is powered by an ignitron-switched capacitor bank. High-pressure gas will be puffed into an annular gap between inner and outer coaxial electrodes. An applied high voltage ionizes the gas and creates a radial current sheet. The 100kA discharge current generates toroidal flux; poloidal flux is provided by using an external bias magnet. The axial J×B force ejects plasma out of the gun. If the J×B force exceeds the magnetic tension of the poloidal flux by a sufficient amount then a detached magnetized plasma will be formed. The poster will discuss the plasma bubble formation system including the power system, gas valve control system, bias flux power system, and the magnetic probe diagnostic in detail. Experimental data will be provided.

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Yue Zhang
University of New Mexico

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