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Experimental investigation in plasma relaxation by using a compact coaxial magnetized plasma gun in a background plasma YUE ZHANG, ALAN LYNN, MARK GILMORE, University of New Mexico, SCOTT HSU, Los Alamos National Lab, UNIVERSITY OF NEW MEXICO COLLABORATION, LOS ALAMOS NATIONAL LAB COLLABORATION — A compact coaxial plasma gun is employed for experimental studies of plasma relaxation process being conducted in the HELCAT device at UNM. These studies will advance the knowledge of basic plasma physics in the areas of magnetic relaxation and space and astrophysical plasmas, including the evolution of active galactic jets/radio lobes. The gun is powered by a 120pF ignitron-switched capacitor bank which is operated in a range of 5 - 10kV. Multiple diagnostics are employed to investigate plasma relaxation process. Magnetized Argon plasma bubbles with velocities 1.2Cs and densities 10e20 m-3 have been achieved. Different distinct regimes of operation with qualitatively different dynamics are identified by fast CCD camera images, with the parameter lambda determining the operation regime. Additionally, a B-dot probe array is employed to measure the spatial toroidal and poloidal magnetic flux evolution to identify detached plasma bubble configurations. Experimental data and analysis will be presented.

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