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**Improvements to Passively Switched CTIX Compact Toroid Accelerator** ROBERT HORTON, DAVID HWANG, STEPHEN HOWARD, SAMUEL BROCKINGTON, RUSSELL EVANS, University of California, Davis — Recent changes in gas injection technique have enabled considerable improvements in plasma density, total mass, and energy conversion efficiency obtained in the CTIX compact-toroid (CT) experiment. A major remaining source of energy loss is magnetic energy stored in residual inductance of an external saturable inductor, used to delay application of CT acceleration voltage. Currently, over 50% of accelerator capacitor energy is converted to inductive energy in this circuit, versus up to 25% in plasma kinetic energy. Modifications to CTIX will reduce saturated circuit inductance to less than 40% of its present value. Results of operation with reduced inductance will be presented, with a goal of increasing CT kinetic energy density, required for penetration of high-magnetic-field target plasmas. Accelerator-region gas puffing will be used to match plasma time of flight to relevant circuit time scales. Diagnostics will include interferometry, deflectometry, magnetic-field, and spectroscopic measurements. Plasma acceleration and mass accumulation will be compared with a one-dimensional plasma/gas/circuit model. Supported by U.S. DOE Grant DE-FG02-03ER54732.

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