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Low-Inductance Load Test of a New 300-kA, 150-ns Pulser for Fast X-Pinch Sources

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X pinches are well-known sources for point-projection radiography: given the right conditions, they generate very bright, x-ray bursts launched from a very small, dense plasma source. To advance the performance of these x pinches, a new, compact pulser was built at the University of Rochester. The pulser is a spin-off of Linear Transformer Driver technologies: it consists of 5 LTD bricks (which is two capacitors and high-current switch all are connected in series) directly coupled to the transmission line, with bricks hanging from the transmission line rather than positioned radially outward, as it is the case in usual LTD designs. The pulser can store up to 1-kJ of initial energy when charged to ± 100 kV, and simulations predict it can deliver up to 300-kA of peak current into an inductive x-pinch load with less than 150-ns time-to-peak. In this paper we present short-circuit measurements of the pulser. The load is 2.54-cm-long, 96-cm-diameter metal cylinder installed in the anode-cathode gap with inductance of only 1.13 nH. The current oscillations into this load allow us to directly measure the driver internal inductance and resistance. The data will be compared with the Screamer simulations.

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