

Abstract Submitted
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Hybrid X-Pinch Optimization¹ AHMED ELSHAFIEY, JEFFREY MUSK, Cornell University, SERGEI PIKUZ, TANIA SHELKOVENKO, Lebedev Physical Institute, DAVID HAMMER, Cornell University — We are planning detailed spectroscopic studies of the X-ray bursts produced by hybrid X-pinch using 20 ps time resolution X-ray streak cameras. The purpose is to investigate whether radiative collapse occurs in the micropinches that produce the X-ray bursts. In order to do that, we want 1 strong X-ray burst from the hybrid X-pinch at a time that is reproducible within +/- 1 ns. As a first step, we have optimized Hybrid X-Pinches made of Al, Ag, Mo, and Ti by varying the gap distance between the two conical electrodes, keeping the mass per unit length constant across all the different materials. For all materials, 0.5-1.5 mm gap appears to be satisfactory to assure a single micropinch from a 250-300 kA, 50 ns rise time current pulse on the XP pulsed power generator. We also optimized the timing of the X-ray burst for Ti wire loads, so that more than 50 percent of the shots produced X-rays at a consistent time. Time consistency was achieved by varying the gap distance and changing the wire diameter. It was found that smaller diameter wires with larger electrode gap distances, were more consistent. We are also in the process of expanding this study to include more data points, as well as other load wire materials.

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