

Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Seeking Experimental Evidence for Radiative Collapse in Hybrid X-pinch¹ AHMED ELSHAFIEY, Cornell University, JEFFERY MUSK, Sandia National Labs, IVAN TILIKIN, TANIA SHELKOVENKO, SERGEI PIKUZ, P. N. Lebedev Institute, DAVID HAMMER, Cornell University — We present results of initial studies of the X-ray bursts produced by Hybrid X-pinch (HXP) in the soft X-ray spectral range using ~ 10 ps time resolution X-ray streak cameras. The first goal is to collect X-ray spectra that can illuminate the role of radiative collapse in the formation of the micropinch that produce the X-ray bursts. The second goal is to obtain time-resolved source size measurements in the 2.5-5 keV X-ray energy range. To do that and capture the spectrum or source image on the streak camera on its 1 ns full screen streak, we must have a strong X-ray burst from the HXP at a time that is reproducible within 1 ns. As a first step, we tested the results produced by HXP made of Al, Ag, Mo, and Ti by varying the gap distance between the two conical electrodes and the wire sizes, keeping the mass per unit length constant across all the different materials, using the 250-300 kA, 50 ns rise time current pulse on the XP pulsed power generator. Using 40 μ m Ti wires, more than 50% of 44 pulses produced X-ray bursts between 33-35 ns after the start of the current pulse. Initial time-resolved source size measurements and X-ray spectra from Ti and Mo with ~ 10 ps time resolution have been obtained. Further studies with higher magnification are being carried to accurately determine the source size.

¹DOE Office of Science grant DESC0018088

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Date submitted: 01 Jul 2020

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