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Dynamics of low-density coronal plasma in low current x-pinches
FARHAT BEG, DAVID HAAS, University of California San Diego, VICTOR VIKHREV, RRC Kurchatov Institute, BRIAN BUCKER, DIMITRY FEDIN, University of California San Diego, ELENA BARANOVA, RRC Kurchatov Institute, YOSSOF ESHAQ, SERGEI KRASHENINNIKOV, University of California San Diego — A series of experiments have been performed to study the low-density coronal plasma formation in x-pinches driven by a current generator capable of producing an 80 kA current with a rise time of 40 ns. Various wire materials including: aluminum. copper, nickel, stainless steel, molybdenum and tungsten were used. Simultaneous optical probing techniques, (schlieren, interferometry) and gated XUV imaging were used to record information in various density ranges. X-pinches consisting of aluminum, copper and molybdenum showed the coronal plasma streams towards the mid plane, where it converges. It then forms a sheath on either side of the cross-point, which moves with a velocity 6 x 10^5 $cm\ s^{-1}$ towards the electrodes. The coronal plasma dynamics were significantly different in tungsten x-pinches, where no such sheath formation was observed. Experimental results quantitatively agree with 2D MHD simulations.

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