

Abstract Submitted
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Schlieren Cinematography of Current Driven Plasma Jet Dynamics KEITH LOEBNER, Stanford University, THOMAS UNDERWOOD, Stanford Univ, MARK CAPPELLI, Stanford University — Schlieren cinematography of a pulsed plasma deflagration jet is presented and analyzed. An ultra-high frame rate CMOS camera coupled to a Z-type laser Schlieren apparatus is used to obtain flow-field refractometry data for the continuous flow Z-pinch formed within the plasma deflagration jet. The 10 MHz frame rate for 256 consecutive frames provides high temporal resolution, enabling turbulent fluctuations and plasma instabilities to be visualized over the course of a single pulse (20 μ s). The Schlieren signal is radiometrically calibrated to obtain a two dimensional mapping of the refraction angle of the axisymmetric pinch plasma, and this mapping is then Abel inverted to derive the plasma density distribution as a function radius, axial coordinate, and time. Analyses of previously unknown discharge characteristics and comparisons with prior work are discussed.

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