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A Hydrodynamic Lengthscale for Characterizing Stagnation[1]
SETH DAVIDOVITS, Lawrence Livermore Natl Lab — It is generally challenging to infer the hydrodynamic organization of the stagnation plasma in compression experiments, owing to the short timescales and small spatial scales in such plasmas and the frequent diagnostic necessity to integrate over sight lines. Here we present an analysis technique that, using time-resolved (through experimental repeatability), but spatially integrated, measurements of stagnating plasma, allows for the inference of a hydrodynamic length scale. We show that, theoretically, this inferred length scale can be related to the degree to which a stagnation is hydrodynamically "ideal". Applying this analysis technique to both data from a Z-pinch compression which may be turbulent at stagnation, and synthetic data from a 2D simulation of the same pinch, which stagnates axisymmetrically and without turbulence, we find initial evidence to support this theoretical prediction.

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