

Abstract Submitted
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Development of Azimuthal Asymmetries in Θ -pinch FRC Preionization: Simulation vs. Experiment¹ MICHAEL H. FRESE, SHERRY D. FRESE, NumerEx — Over the next few years at AFRL, FRCs will be formed, translated into and captured in imploding liners, and compressed to fusion conditions to investigate magnetized plasma compression. Recent experiments have shown smaller differences between vacuum and plasma shot magnetic probe signals than predicted by MACH2 2-d r-z simulation, implying smaller FRC radii and entrained mass. Understanding the causes of this apparent mass loss could lead to making substantially more robust FRCs. MACH2 2-d r- θ simulations show gross asymmetries developing during the multiple Θ -pinches of the preionization phase caused by the magnetic Rayleigh-Taylor instability. The asymmetric plasma configurations in these simulations strongly resemble axial-view visible light images from previous preionization experiments on FRCX at Los Alamos. In the simulations, plasma flows to the wall and could be lost there. These simulations strongly suggest that 3-d simulations will be necessary for complete understanding of the full process, and they are, in part, preparation for those.

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