Abstract Submitted
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Observation of a stagnation wave in the Fusion Z-pinch Experiment (FuZE)[1] ELLIOT CLAVEAU, URI SHUMLAK, University of Washington, BRIAN NELSON, ZaP Energy, Inc., ELEANOR FORBES, AQIL KHAIRI, ANTON STEPANOV, TOBIN WEBER, University of Washington, YUE ZHANG, ZaP Energy, Inc., HARRY MCLEAN, Lawrence Livermore National Laboratory — The Fusion Z-pinch Experiment (FuZE) is a sheared-flow-stabilized Z pinch based on the ZaP and ZaP-HD experiments. The FuZE device generates neutron-producing, 50-cm-long Z pinches formed from plasma accelerated through coaxial electrodes. The Z-pinches are sustained between a nose cone at the tip of the plasma gun and an end wall at the end of the assembly region flux conserver. The end wall geometry is modified from a central hole to a spoked design and it is found that plasma exhaust through the end wall is dictated by the ratio of magnetic field pressure to the sum of thermal and ram pressures. The limited plasma exhaust results in a reflected wave traveling against the plasma flow. This wave corresponds to a collisional shock transforming flowing background plasma properties to stagnated plasma properties through the Rankine-Hugoniot relations. The plasma linear density is increased across the shock, increasing the pinch current in order to keep the magnetic flux constant. Sheared flow profiles are also changed from hollow to peaked.

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