Abstract Submitted
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Overview and recent results of the Magnetized Shock Experiment (MSX)[1] T.E. WEBER, Los Alamos National Laboratory, R.J. SMITH, University of Washington, S.C. HSU, Los Alamos National Laboratory, Y. OMELCHENKO, Trinum Research Inc. — Recent machine and diagnostics upgrades to the Magnetized Shock Experiment (MSX) at LANL have enabled unprecedented access to the physical processes arising from stagnating magnetized ($\beta \approx 1$), collisionless, highly supersonic ($M, M_A \approx 10$) flows, similar in dimensionless parameters to those found in both space and astrophysical shocks. Hot (100s of eV during translation), dense ($10^{22} - 10^{23}$ m^{-3}) Field Reversed Configuration (FRC) plasmoids are accelerated to high velocities (100s of km/s) and subsequently impact against a static target such as a strong parallel or anti-parallel (reconnection-wise) magnetic mirror, a solid obstacle, or neutral gas cloud to recreate the physics of interest with characteristic length and time scales that are both large enough to observe yet small enough to fit within the experiment. Long-lived (>50 μs) stagnated plasmas with density enhancement much greater than predicted by fluid theory (>4x) are observed, accompanied by discontinuous plasma structures indicating shocks and jetting (visible emission and interferometry) and copious >1 keV x-ray emission. An overview of the experimental program will be presented, including machine design and capabilities, diagnostics, and an examination of the physical processes that occur during stagnation against a variety of targets.

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