Abstract Submitted
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First results of transcritical magnetized collisionless shock studies on MSX[1] T.E. WEBER, Los Alamos National Laboratory, R.J. SMITH, T.M. HUTCHINSON, University of Washington, Seattle, S.F. TAYLOR, University of Wisconsin, Madison, S.C. HSU, Los Alamos National Laboratory — Magnetized collisionless shocks exhibit transitional length and time scales much shorter than can be created through collisional processes. They are common throughout the cosmos, but have historically proven difficult to create in the laboratory. The Magnetized Shock Experiment (MSX) at LANL produces super-Alfvénic shocks through the acceleration and subsequent stagnation of Field Reversed Configuration (FRC) plasmoids against a strong magnetic mirror and flux-conserving vacuum boundary. Plasma flows have been produced with sonic and Alfvén Mach numbers up to $\sim$10 over a wide range of plasma beta with embedded perpendicular, oblique, and parallel magnetic field. Macroscopic ion skin-depth and long ion-gyroperiod enable diagnostic access to relevant shock physics using common methods. Variable plasmoid velocity, density, temperature, and magnetic field provide access to a wide range of shock conditions, and a campaign to study the physics of transcritical and supercritical shocks within the FRC plasmoid is currently underway. An overview of the experimental design, diagnostics suite, physics objectives, and recent results will be presented.

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