Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

**Exploring Astrophysically Relevant Bow Shocks Using MIFEDS and the OMEGA Laser**[1] JOSEPH LEVESQUE, CAROLYN KURANZ, RACHEL YOUNG, GENNADY FIKSEL, MARIO MANUEL, MATTHEW TRANTHAM, SALLEE KLEIN, University of Michigan, PATRICK HARTIGAN, ANDY LIAO, Rice University, CHIKANG LI, Massachusetts Institute of Technology —
We present current experiments using the Omega Laser Facility and their magneto-inertial fusion electrical discharge system (MIFEDS) to observe the effect of magnetic pressure on bow shock dynamics in an astrophysically relevant regime. Astrophysical bow shocks are an interesting phenomenon in which a shock forms when incident supersonic flow encounters a sufficiently magnetized medium surrounding an object. The most well-known example of this phenomena is the interaction of the solar wind with the Earth's magnetic field, which creates our magnetosphere. In our experiment the magnetosphere will be emulated by a current flowing through a curved wire to create an azimuthal magnetic field. To create the analogous solar wind, lasers rear-irradiate two opposing graphite targets so the plasma outflows collide and then expand along the collision plane toward the magnetized wires. We use the UV Thomson scattering diagnostic technique to determine plasma parameters along with optical imaging and proton radiography to characterize the plasma flow and the bow shock that forms.

[1]This work is supported by the U.S. DOE, through NNSA grants DE-NA0002956 (SSAA) and DE-NA0002719 (NLUF), by the LLE under DE-NA0001944, and by the LLNL under subcontract B614207 to DE-AC52-07NA27344.

Joseph Levesque
University of Michigan

Date submitted: 08 Aug 2016 Electronic form version 1.4