Abstract Submitted
for the APR08 Meeting of
The American Physical Society

Plasma Formation on the Surface of mm-Diameter Aluminum Rods by Pulsed Megagauss Magnetic Field THOMAS AWE, RICHARD SIEMON, BRUNO BAUER, STEPHAN FUELLIING, VLAD MAKHIN, IRV LINDEMUTH, University of Nevada, Reno — Megagauss magnetic field is pulsed on millimeter-diameter aluminum rods resulting in heating inside the skin depth, and plasma formation in a thinner layer at the surface. Driven by the University of Nevada, Reno-Nevada Terawatt Facility's (UNR-NTF) 2TW Zebra Z-pinch, 1.0 MA is delivered to the load, rising to current maximum in ∼100ns. The load radius is chosen to be larger than the skin depth, placing the experiment in the 'thick wire' regime. In contrast to a thin uniform-current- density exploding wire, a thick wire exhibits plasma and magnetic pressure balance during current rise. Free expansion is limited, resulting in high energy density and temperature. The experiment is designed to limit large scale instability growth until after peak field. During current rise, dynamic equilibrium is achieved for some 10's of nanoseconds and quasi-stable aluminum plasma heated to over 10 eV is held between a 3-5 megagauss magnetic field and a cool, dense, liquid aluminum wall. Preliminary understanding of the evolution of the rod interior and surface plasma is detailed with both experimental and computational results. Plans for future experiments, including new load designs and diagnostics under development, are given.

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Date submitted: 17 Jan 2008 Electronic form version 1.4