Recent studies of the possibility of Warm Dense Matter (WDM)/High Energy Density Physics (HEDP) science driven by ion accelerators have indicated that relatively large regions with homogeneous conditions can be created in a target by using ions at the Bragg peak. The ion driver and focusing system must supply a beam that is sufficiently compressed in time and space to achieve the required intensity and with a sufficient uniformity and sufficiently small velocity spread to assure a target with minimal variations in temperature and density. These goals are challenging, but do not seem unobtainable. The workshop will examine three concepts already under consideration and consider the requirements for an integrated scientific exploration of HEDP using such a driver.

The broad objectives of this workshop are to:

1. Explore options and possibilities for a staged experimental program in WDM/HEDP that utilizes ion accelerator sources as they become available, from early machines that can be developed at modest cost beginning with existing equipment, to later machines that reach well into the HEDP regime. Define physics regimes and scientific objectives to be explored, requirements for targets and diagnostics, and the scientific program that can be carried out using the ion beam drivers under consideration.

2. Study various approaches, including conceptual designs of three types of accelerators: pulse-power-driven single-stage diodes; pulse-power-driven multi-stage accelerators; and rf-accelerators. In addition, study options for pulse compression and final focus.

Important issues to be considered in developing a program for ion driven HEDP science are:

- Precise control and uniformity of energy deposition;
- Large sample sizes compared to diagnostic resolution volumes;
- A benign environment for diagnostics (low debris and radiation background);
- High shot rates (10/hour to 1/second) and multiple beamlines/target chambers;
- Sites with easy access for broad participation by university scientists and students; and with the technical support for designing and fielding targets for qualified experiments.
- Low cost
- State of technological readiness

As a starting point we will aim for target characteristics that fall within a broad range in temperature and density, (these properties are to be defined more precisely by the HEDP experiments working group): Temperature between 0.1and 30 eV, density between 10^-3 to 30 g/cm^3.

The temperature must be constant over a hydrodynamic expansion time, and the volume must be sufficiently large to be able to diagnose the state of the properties with minimal (<~5%) variations over the volume being diagnosed. Additionally, the energy deposition over the volume must result in similarly small (<5%) variation in the volume being diagnosed. As a specific example, consider a Ne+1 beam, entering a 70 micron thick Aluminum foam target (mass density rho =0.1 solid density), with ion central energy entering the foam at 19 MeV, and exiting at 4.4 MeV. The combination $N_{ions}/(r_{spot}/1mm)^2 > 1.4*10^{13}$, where N_{ions} is the number of ions in the pulse and r_{spot} is the equivialent pulse radius if the intensity were uniformly distributed over a circle of radius equal to r_{spot}. If the pulse duration is less than 1 ns, this should result in a 15 eV plasma, with mean ionization state of 2.7, and mean energy density 1.3*10^11 J/m^3.