Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

High Brightness Accelerator for Warm Dense Matter Studies.[1] ENRIQUE HENESTROZA, SIMON S. YU, Lawrence Berkeley National Laboratory, DAVID P. GROTE, Lawrence Livermore National Laboratory, RICHARD J. BRIGGS, SAIC — A high brightness heavy ion accelerator for creating powerful beams to study warm dense matter is being designed at LBNL. The components are an injector that delivers 0.1 μC of sodium beam, and an accelerator that boosts the energy to about 20 MeV. Further beam manipulations will compress the beam to a final spot radius of 1 mm and a pulse length of 1 ns. In order to reach those final parameters, it is required to extract a high brightness beam and minimize the transverse and longitudinal emittance growth along the accelerator. The injector is based on the Accel-Decel concept which enables the extraction of a high line charge density beam from the ion source, and the accelerator is based on the Pulse Line Ion Accelerator concept, which uses a slow-wave structure based on a helical winding, on which a voltage pulse is launched and propagated to generate the accelerating fields. We will present numerical simulations of the beam dynamics in this system.

[1]This work was supported by DOE under Contract No. DE-AC02-05CH11231 and W-7405-ENG-48

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Date submitted: 22 Jul 2005 Electronic form version 1.4