Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Ion emission in a LWFA at the wake-vacuum boundary using ionization injection NUNO LEMOS, GoLP/Instituto de Plasmas e Fusão Nuclear, Instituto Superior Técnico, Lisboa, K.A. MARSH, Department of Electrical Engineering, UCLA, Los Angeles, California 90095, USA, A. PAK, Livermore National Laboratory, 7000 East Ave., Livermore, California 94550, J.L. MARTINS, J.M. DIAS, GoLP/Instituto de Plasmas e Fusão Nuclear, Instituto Superior Técnico, Lisboa, C. JOSHI, Department of Electrical Engineering, UCLA, Los Angeles, California 90095, USA — Recent experiments with a LWFA electron acceleration showed it is possible to accelerate ions in under dense plasmas. Profiting from the high energy, high temperature and high charge electron beams of the ionization induced trapped electron beams scheme in LWFA we perform an experimental study in which the ions are accelerated to tens of MeV range. The acceleration mechanism is mainly based on the generation of a longitudinal electric field at the wake-vacuum boundary. The low energy electrons are pulled back into the plasma in a vortex kind of motion, producing an azimuthal magnetic field at the interface. This time dependent B field in turn produces an electrical field capable of accelerating the ions located at the boundary to MeV energies. The physics of the interaction is studied with 2D and 3D particle-in-cell simulations. Work supported by DOE grant DE-FG02-92ER40727, NFS grant PHY-0936266 and FCT grant SFRH/BD/37838/2007.

Nuno Lemos
GoLP/Instituto de Plasmas e Fusão Nuclear,
Instituto Superior Técnico, Lisboa

Date submitted: 21 Jul 2011 Electronic form version 1.4