Contribution ID: 104

a novel plasma source for beam driven wakefield acceleration

Monday, 3 June 2013 19:30 (30 minutes)

A proton driven plasma wakefield accelerator (pdpwa) experiment using CERN proton bunches is proposed by the Advanced Wake Field Accelerator (AWAKE) collaboration. 12 cm, 400 GeV CERN proton beam enters a 10 meter long plasma and the transverse selfmodulationinstability causes the proton beam to self modulate. The modulated beam behaves as a sequence of microbunches and starts resonantly driving a large wake (~GV/m). In this wake a ~20 MeV copropagating electron bunch will be injected. The plasma source is a 10 meter long Rubidium vapor which is fully tunnelionized by a laser. There is a strict requirement on the plasma uniformity. For the injected electron bunch to stay in the accelerating and focusing phase of the plasma wake the relative nonuniformity anywhere along the Rb vapor is not to exceed 0.2%. The plasma source developed at the Max Planck Institute for Physics is presented. Rb is confined in a long, 2 cm diameter heated pipe. The required uniformity is satisfied for a range of densities around optimum density of (7x10^15 cm-3). Fast valves provide beam access to the source. The source design, the effect of the valves, the expected neutral and plasma densities will be presented.

Primary author: Dr OZ, Erdem (Max Planck for Physics)

Co-authors: Prof. CALDWELL, Allen (max planck institute for physics); Prof. MUGGLI, Patric (Max-Planck-Institut für Physik)

Presenter: Dr OZ, Erdem (Max Planck for Physics)

Session Classification: Wine and Poster Session

Track Classification: Wine and Poster Session