



Contribution ID: 229

Type: poster

The Effects of Tape-Based Plasma Mirrors on GeV Electron Beams, with a View to Staging Laser Wakefield Accelerators

Monday, September 16, 2019 7:00 PM (1 hour)

To overcome dephasing and pulse depletion while maintaining a high average accelerating gradient, staging multiple 10 GeV level Laser Wakefield Accelerators has been proposed. To minimise the total length of a staged accelerator laser beams must be introduced at an angle to the beamline. A convenient solution to reflect the intense laser pulse on to the beamline is to use a thin, moveable tape as a plasma mirror. Tapes can also be used to block depleted laser pulses from damaging later stages or beam optics.

We will present experimental results of the effects of tape-based plasma mirrors on 1-2 GeV electron beams. While the divergence increase of the electron bunch passing through 'cold' tape material was small, when the tape was used as a plasma mirror the laser-produced plasma caused a large increase in the beam divergence integrated over electron energy. Spectrally dispersed measurements of the electron beam indicate that the transverse momentum gain was correlated with longitudinal momentum. Consequent limitations of staging schemes will be discussed.

Primary authors: WOOD, Jonathan (Imperial College London); GRUSE, Jan-Niclas (Imperial College London); ROZARIO, Savio (Imperial College London); SHALLOO, Rob (Imperial College London); Dr STREETER, Matthew (Imperial College London); AUDET, Thomas (The Queen's University of Belfast); Mr BACKHOUSE, Michael (Imperial College London); Dr BOURGEOIS, Nicolas (Central Laser Facility (CLF)); GERSTMAYR, Elias (Imperial College London); Dr LOPES, Nelson (Instituto Superior Técnico); MANGLES, Stuart (Imperial College London); PODER, Kristjan (DESY); PATTATHIL, Rajeev (Central Laser Facility.); SARRI, Gianluca (Queen's University Belfast); NAJMUDIN, Zulfikar (Imperial College London)

Presenter: WOOD, Jonathan (Imperial College London)

Session Classification: Cheese and Wine Poster Session 1

Track Classification: WG8 - Advanced and novel accelerators for High Energy Physics