

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

QuickPIC Simulations on Recent PWFA Experiments at FACET¹

WEIMING AN, Univ of California - Los Angeles, ERIK ADLI, JAMES ALLEN, CHRISTINE CLARKE, SLAC, CHRIS CLAYTON, Univ of California - Los Angeles, SEBASTIEN CORDE, JOEL FREDERICO, SPENCER GESSNER, SELINA GREEN, MARK HOGAN, SLAC, CHAN JOSHI, Univ of California - Los Angeles, MIKE LITOS, SLAC, WEI LU, Tsinghua University, KEN MARSH, WARREN MORI, NAVID VAFAEI-NAJAFABADI, Univ of California - Los Angeles, VITALY YAKIMENKO, SLAC — The plasma wake field accelerator (PWFA) is a promising advanced accelerator concept for making a more compact and cheaper future high energy accelerator. We present QuickPIC simulations of three PWFA experiments at FACET, SLAC. The first one demonstrated high efficiency, high gradient acceleration of electrons with low energy spread through the “two-bunch” scheme, in which an electron drive bunch excites a wake while and a second trailing bunch surfing the wake gets accelerated. The second one demonstrates high energy gain of positrons with low energy spread through a “self-load” scheme, in which a single positron bunch propagating in the plasma drives a wake wave and the rear part of the positron bunch loads and surfs the wake to high energy. The third one is electron acceleration in a plasma hollow channel, in which an electron bunch propagates through a plasma hollow channel that is pre-ionized by a Bessel laser beam.

¹Work supported by DOE and NSF.

Weiming An
Univ of California - Los Angeles

Date submitted: 24 Jul 2015

Electronic form version 1.4