Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Wavelength and Intensity Dependence of the Standing Wave Mechanism in the Near-IR Regime in Producing High Energy Backwards Electron Beams GREGORY NGIRMANG, CHRIS ORBAN, The Ohio State University, Department of Physics, SCOTT FEISTER, The Ohio State University, Department of Physics; Innovative Scientific Solutions, Inc. Dayton OH, JOHN MORRISON, Air Force Research Laboratory, Dayton OH, ENAM CHOWDHURY, The Ohio State University, Department of Physics; Intense Energy Solutions, Inc. Dayton, OH, WILLIAM ROQUEMORE, Air Force Research Laboratory, Dayton OH — Laser-plasma interactions involving ultra-short ultra-intense, near IR or IR wavelength lasers represent a novel regime, specifically inducing relativistic dynamics of charges at lower intensities than required for current ultra-intense lasers. We present 2D($3v$) Particle-in-Cell(PIC) simulations using the LSP code that produce super-ponderomotive MeV electron beams from ultra-short ultra-intense IR or Near-IR laser beams incident on targets with significant pre-plasma. We perform simulations across different wavelengths, including 800 nanometer, 3 microns, and 10 microns. We also simulate different pulse energies varying from tens of microjoules to tens of joules, and different scale lengths of pre-plasma. The accelerated electrons energies reach super-ponderomotive energies that scale roughly with the normalized vector potential, in line with the standing wave acceleration mechanism discussed in Orban et. al. The angular spectrum of ejected electrons in all cases are similar, displaying preferred angles as suggested by the elaborations on the standing wave mechanism explained in Ngirmang, et. al.

Gregory Ngirmang
The Ohio State University, Department of Physics

Date submitted: 16 Sep 2016 Electronic form version 1.4