Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Magnetic deflection of MeV electrons in 3D simulations of intense laser-solid interaction F. PEREZ, A. KEMP, L. DIVOL, C.D. CHEN, P.K. PATEL, Lawrence Livermore National Laboratory, CA, USA — Using three-dimensional particle-in-cell (PIC) simulations of 10^{19} - 10^{20} W/cm^2 laser-solid interaction, we find that the reflected laser light, while only 15% of the incident laser power, accelerates electrons (away from the target) at both a higher density and over a larger volume than the incident light. It results in a strong current that dominates the generation of magnetic fields. These fields have important consequences for the laser-accelerated relativistic electron beam, with a significant fraction of the multi-MeV electrons re-directed away from their initial direction along the laser axis. This effect, not described in previous literature, is strongly dependent on incident angle and can change the interpretation of divergence and directionality measurements in laser experiments. We have developed a reduced model reproducing the essential physics of this magnetic field generation and electron beam deflection. We investigate how this will affect experiments in Omega EP or future facilities which feature large spot sizes and longer pulses.

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Date submitted: 09 Jul 2013 Electronic form version 1.4