Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

PIC Simulations of the Omega-EP Magnetic Reconnection Experiment[1] WENDA LIU, ERIC BLACKMAN, RUI YAN, CHUANG REN, University of Rochester — In an Omega EP experiment on magnetic reconnection, two laser beams with peak intensity of $7 \times 10^{18}\mathrm{W/cm^2}$ are focused on a Cu-target. Here we report 2D PIC simulation results with parameters derived from the experiment including a realistic ion-electron mass ratio. We find that 1) toroidal and mega-gauss-scale magnetic fields are generated and a bubble of high-energy-density plasma is produced from single beam-target interactions and 2) the magnetic topology changes as two such bubbles expand and interact with each other indicating the occurrence of magnetic reconnection. The reconnection can occur even when the bubble expansion velocity is subsonic. Flux pileup is observed when the expansion velocity is supersonic. Energetic Cu-ions with energy up to 12 MeV are also observed in the outflow.

[1]This work was supported by NNSA under Corporate Agreement No. DE-FC52-08NA28302 and Grant No. DE-NA0002205; by DOE under Grant No. DE-FC02-04ER54789; and by NSF under Grant No. PHY-1314734

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Date submitted: 10 Jul 2014 Electronic form version 1.4