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Multi-dimensional simulations of Magnetic Field Seeding of Plasma via Laser Beatwave Interaction[1] DALE WELCH, CARSTEN THOMA, NICHELLE BRUNER, Voss Scientific, DAVID HWANG, University of California, Davis, SCOTT HSU, Los Alamos National Laboratory — Assembling magnetized plasma for inertial fusion permits longer duration and smaller density-radius product fuel implosions by reducing the energy transport significantly. For fusion energy, however, the field must be created with a significant standoff distance. A promising technique for magnetic field production is the beat-wave interaction.[2] Some theoretical results have been confirmed by microwave experiments.[3] Recently, fully-kinetic 2D and 3D simulations of the interaction have been simulated using the Lsp particle-in-cell code. We inject 2 CO_2 100-micron transverse-extent lasers both with 10^{13} W/cm^2 intensity into a peak 3x10^{16} cm^{-3} density plasma at various angles. The calculated interaction produces beatwaves at the predicted wavelength and frequency and drives magnetic fields up to 2.5 kG. We will examine the sensitivity of the efficiency of magnetic field production to laser parameters and plasma density scale length and discuss the application to the Plasma Liner eXperiment at LANL.

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[2]M. N. Rosenbluth and C. S. Liu, Phys. Rev. Lett. **29**, 701 (1972).
[3]J. H. Rogers and D. Q. Hwang, Phys. Rev. Lett. **68**, 3877 (1992).

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