Abstract Submitted
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Coupling Fast Electrons to Compressed Fuel for Fast Ignition[1] M. TABAK, D. STROZZI, H.D. SHAY, D.D. HO, A.J. KEMP, M.H. KEY, L. DIVOL, P. PATEL, Lawrence Livermore National Laboratory — We discuss three schemes that can improve the coupling of short pulse laser generated hot electrons to the fuel. First, we extend the ideas of A. Robinson, et.al., where azimuthal B fields are grown where there are gradients in resistivity. We utilize higher-Z materials where the material temperature can be kept low and resistivity gradients high by a combination of ionization energy costs and radiative losses. The resulting 100 MG fields are sufficient to trap relativistic electrons in cones or pipes. Second, we compress a B_z as part of the capsule implosion. We discuss the constraints that avoiding magnetic field mirroring places on the magnetic field gradients and the hydrodynamic system required to assemble the fuel and field. Third, we investigate short pulse laser driven shock ignition. Here, the compressed fuel stagnates against and deforms a high-Z cone tip. The cone tip is sufficiently thick that the shock does not break out the back side and short-pulse laser produced electrons are trapped within it. This high-Z material is then driven with the short pulse laser. The cone tip then sends a strong convergent shock into the fuel, igniting it.

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Max Tabak
Lawrence Livermore National Laboratory

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