

Abstract Submitted
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Simulations of Laser Preheat Effects on Yield in mini-MagLIF Implosions at Omega LUIS LEAL, ANDREI MAXIMOV, EDWARD HANSEN, JONATHAN DAVIES, DANIEL BARNAK, JONATHAN PEEBLES, ADAM SEFKOW, RICCARDO BETTI, Laboratory for Laser Energetics, University of Rochester — Experiments on OMEGA have shown that DD neutron yield in mini-MagLIF (magnetized liner inertial fusion) implosions increases with preheat laser energy; however, beyond a certain preheat energy yield falls again, faster than predicted by published MagLIF simulations. Past mini-MagLIF simulations have been able to explain the trend in yield as the applied magnetic field is varied without the preheat laser¹. Three-dimensional HYDRA simulations, including the preheat laser, are presented that reproduce the observed trend. The effects varying the preheat laser energy has on neutron-averaged parameters such as ion temperature, areal density, and field compression are discussed, as well as the importance of the Nernst term on the dynamics of the magnetic field during the preheat stage. The possible effects of wall mix into the fuel is also investigated in simulations, including a fuel region doped by possible mix elements that can enter into the fuel region. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0003856. ¹E. C. Hansen et al., Phys. Plasmas 27, 062703 (2020).

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