

Abstract Submitted  
for the DPP20 Meeting of  
The American Physical Society

**Exploring improved simulation techniques for analysis and design of auto-magnetizing liner experiments** GABRIEL SHIPLEY, THOMAS AWE, BRIAN HUTSEL, Sandia National Laboratories, JOHN GREENLY, Cornell University, STEPHEN SLUTZ, Sandia National Laboratories — Auto-magnetizing (AutoMag) liners are designed to produce strong internal axial magnetic field (30-100 T) to premagnetize the fuel in MagLIF without external coils. AutoMag liners are made of discrete helical conductors encapsulated by electrically insulating material. Initially, internal axial field is generated as current flows through the conductors. When the driver current rises more rapidly, the insulating material undergoes dielectric flashover (ceasing axial field production) and the helical liner implodes. Dielectric breakdown is notoriously difficult to model; thus, experiments are crucial to developing and tuning simulations. Recent AutoMag experiments on the Mykonos accelerator (800 kA, 100 ns) diagnosed the evolution of dielectric breakdown with photodiodes and 12 frame gated imaging; data have helped to construct a novel method for approximating the AutoMag flashover process in MHD simulations. The method is based on insertion of “broken down” insulator material at prescribed moments during the current pulse (informed by experimental data). Implementation has improved agreement of simulations with data captured on Z. SNL is managed and operated by NTESS under DOE NNSA contract DE-NA0003525.

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Date submitted: 29 Jun 2020

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