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Pulsed Magnetic Field System for Magnetized Target Experiments at the National Ignition Facility[1] M.A. RHODES, J.M. SOLBERG, B.G. LOGAN, L.J. PERKINS, Lawrence Livermore Natl Lab — High-magnitude magnetic fields applied to inertially confined targets may improve fusion yield and enable basic science applications. We discuss the development of a pulsed magnetic field system for NIF with the goal of applying 10-70T to various NIF targets. While the driver may be little more than a spark-gap switched capacitor, numerous complex challenges exist in fielding such a system on NIF. The coil surrounding the metallic hohlraum drives induced current in the hohlraum wall. Both the coil and hohlraum wall must survive ohmic heating and JxB forces for several microseconds. Pulsed power must couple to the coil in the NIF environment. The system must not cause late-time optics damage due to debris. There is very limited volume for the driver in a NIF Diagnostic Instrument Manipulator (DIM). We are modeling the coil and hohlraum MHD effects with the LLNL code, ALE3D. However, the simulations lack complete and accurate data for all the required thermo-physical material properties over the expected range of temperatures (below vaporization) and pressures. Therefore, substantial experimental development is planned in the coming year. We present coil and hohlraum simulations results, overall system design, and progress towards an operational prototype test-stand.

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