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Creating and Mining a Large Database of 2-D NIF Implosion Simulations BRIAN SPEARS, C. CERJAN, S. HAAN, S. HATCHETT, D. WILSON, Lawrence Livermore National Laboratory — Iterating to ignition success on NIF will require capsule and drive specifications that give a reasonable *a priori* chance of ignition and robust diagnostics that allow a physical understanding of the experimental implosion dynamics. To supply a basis for our physical understanding we have focused on a measure of ignition margin as a function of 4 performance parameters — fuel velocity, fuel entropy, mix, and hot-spot radial rms. To this end, we have created a large database of 2-D implosion simulations corresponding to points covering the input parameter space defined by the capsule and drive specifications. Each simulation is post-processed to supply diagnostic signatures, with and without modeled errors, that constrain the associated diagnostic experiment, and the associated four performance parameters. Finally, a data mining algorithm is applied to extract relationships among diagnostic features and performance parameters. These correlations are then used to establish experimental design requirements and rectify non-optimal implosion behavior. LLNL-ABS-405318. This work performed under the auspices of Lawrence Livermore National Security, LLC, (LLNS) under Contract DE-AC52-07NA27344.

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