Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Quantifying uncertainty in the predicted performance of inertial confinement fusion experiments[1] JIM GAFFNEY, SCOTT BRANDON, KELLI HUMBIRD, MICHAEL KRUSE, BOGDAN KUSTOWSKI, RYAN NORA, LUC PETERSON, BRIAN SPEARS, Lawrence Livermore Natl Lab — State-of-the-art high-throughput simulation studies, combined with experimental data collected at the National Ignition Facility, are enabling the development of statistically calibrated, data-driven models for the performance of indirect-drive inertial confinement fusion experiments. These models match a diverse set of experimental observables over a whole series of NIF laser shots and provide predictions, with uncertainties, over a wide range of experimental design parameters. We will describe our statistical model, and assess the factors driving prediction uncertainty for current NIF implosions. The balance between uncertainty sources such as shot-shot variation, incomplete experimental constraints on physics parameters, and interpolation to new experimental parameters suggests new experimental and simulation studies that reduce prediction uncertainty; we will present some of these and discuss their implications for NIF 'BigFoot' implosion studies.

[1]LLNL-ABS-780203. Prepared by LLNL under Contract DE-AC52-07NA27344.

Jim Gaffney
Lawrence Livermore Natl Lab

Date submitted: 03 Jul 2019 Electronic form version 1.4