Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Predicting Neutron Yield of NIF ICF Experiments by Applying Machine Learning to a Small (n¡150) and Heterogeneous Experimental Dataset[1] ANDREW MARIS, Massachusetts Institute of Technology, Plasma Science and Fusion Center, Cambridge, MA 02139, SHAHAB KHAN, LUC PETERSON, KELLI HUMBIRD, ARTHUR PAK, Lawrence Livermore National Laboratory, Livermore, CA 94550 — Machine learning (ML) is a promising tool for predicting the performance of fusion experiments. Unfortunately, deep learning models require significant amounts of synthetic data to predict the performance of low shot rate experiments such as the National Ignition Facility (NIF). Here, we present an alternative approach based on shallow ML models trained exclusively on experimental data. We narrow our focus to predicting neutron yield, an important performance metric that is notoriously difficult to estimate. Although the dataset includes fewer than 150 shots, each with widely-varying experimental set-ups, we demonstrate a ML model that predicts the logarithm of neutron yield with an average error of 10

[1]This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344. LLNL-ABS- 811771

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Date submitted: 29 Jun 2020 Electronic form version 1.4