Abstract Submitted
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Enhancing Hohlraum Design with Artificial Neural Networks[1] J. L. PETERSON, L. F. BERZAK HOPKINS, Lawrence Livermore Natl Lab, K. D. HUMBIRD, Lawrence Livermore Natl Lab; Texas AM Univ., S. T. BRANDON, J. E. FIELD, S. H. LANGER, R. C. NORA, B. K. SPEARS, Lawrence Livermore Natl Lab — A primary goal of hohlraum design is to efficiently convert available laser power and energy to capsule drive, compression and ultimately fusion neutron yield. However, a major challenge of this multi-dimensional optimization problem is the relative computational expense of hohlraum simulations. In this work, we explore overcoming this obstacle with the use of artificial neural networks built off ensembles of hohlraum simulations. These machine learning systems emulate the behavior of full simulations in a fraction of the time, thereby enabling the rapid exploration of design parameters. We will demonstrate this technology with a search for modifications to existing high-yield designs that can maximize neutron production within NIFs current laser power and energy constraints.

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