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Applying the minimal energy scaling law to NIF data YI-MING WANG, BAOLIAN CHENG, THOMAS KWAN, STEVEN BATHA, Los Alamos Natl Lab — The minimal energy implosion-scaling model [1] was recently developed to characterize the physical properties of the hot spot in terms of the peak implosion energy. In this model, the hot spot energy, volume, pressure, mass and areal density at the stagnation time are uniquely determined by the peak implosion velocity, the equation of state and the adiabat of the pusher and the DT fuel (cold and hot) at the peak implosion time. In this work, we apply this model to a number of published low-foot and high-foot experiments performed at the National Ignition Facility. Our model analysis is in a good agreement with the experimental data when a high adiabat is assumed for both low and high foot experiments. Implications of the results are discussed. This work was performed under the auspices of the U.S. Department of Energy by the Los Alamos National Laboratory under Contract No. W-7405-ENG-36.

[1] B. Cheng, T. Kwan, Y-M. Wang, and S. Batha, Scaling laws for NIF ignition from first principles, Phys. Rev. E 88 (2013) 041101.

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