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On scaling laws for ignition at NIF[1] BAOLIAN CHENG, THOMAS KWAN, YI-MING WANG, STEVEN BATHA, Los Alamos National Laboratory — The Ignition Threshold Factor (ITF) [1] was developed to guide the ignition campaign at the National Ignition Facility (NIF). In this work, we derive from first-principle the minimum energy required for implosion of a capsule to achieve ignition. We obtain a general expression relating the ITF to the capsule implosion velocity. With a particular choice of the equation of states (EOS) for the fuel, we recover the eighth power dependence. However, the sensitivity of the dependence is found to be different for different choices of EOS. We will present the general results and its significance in achieving ignition at NIF.

[1] S. W. Haan, et. al, Phys. Plasmas 18, 051001 (2011) and references therein.

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