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Knudsen Layer Reduction of Fusion Reactivity KIM MOLVIG, NELSON HOFFMAN, BRIAN ALBRIGHT, ERIC NELSON, EVAN DODD, LANL, GEORGE ZIMMERMAN, LLNL — Knudsen layer losses of tail fuel ions can significantly reduce the fusion reactivity of multi-keV DT in capsules with small fuel ρr ; sizeable yield reduction can result for small inertial confinement fusion (ICF) capsules. This effect is most pronounced when the distance from a burning DT gas region to a non-reacting or cold wall is comparable to the mean free path of reacting fuel ions. A simplified asymptotic theory of Knudsen layer tail depletion is presented and a non-local reduced fusion reactivity model is obtained. Application of the model in simulations of ICF capsule implosion experiments gives calculated yields and ion temperatures that are in much closer agreement with observations than are the results of “nominal” or mixed simulations omitting the model. This work was performed under the auspices of the U.S. Dept. of Energy by the Los Alamos National Security, LLC, Los Alamos National Laboratory.

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