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Knudsen and inverse Knudsen layer effect on tail ion distribution and fusion reactivity in inertial confinement fusion targets C.J. MCDEVITT, X.-Z TANG, Z. GUO, Los Alamos National Laboratory, H.L. BERK, University of Texas, Austin — A series of reduced models are used to study the fast ion tail in the vicinity of a transition layer between plasmas at disparate temperatures and densities, which is typical of the gas-pusher interface in inertial confinement fusion targets. Emphasis is placed on utilizing progressively more comprehensive models in order to identify the essential physics for computing the fast ion tail at energies comparable to the Gamow peak. The resulting fast ion tail distribution is subsequently used to compute the fusion reactivity as a function of collisionality and temperature. It is found that while the fast ion distribution can be significantly depleted in the hot spot, leading to a reduction of the fusion reactivity in this region, a surplus of fast ions is present in the neighboring cold region. The presence of this fast ion surplus in the neighboring cold region is shown to lead to a partial recovery of the fusion yield lost in the hot spot.

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