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Enthalpy generation from mixing in hohlraum-driven targets[1] PETER AMENDT, JOSE MILOVICH, Lawrence Livermore National Laboratory —

The increase in enthalpy from the physical mixing of two initially separated materials is analytically estimated and applied to ICF implosions and gas-filled hohlraums. Pressure and temperature gradients across a classical interface are shown to be the origin of enthalpy generation from mixing. The amount of enthalpy generation is estimated to be on the order of 100 Joules for a 10 micron-scale annular mixing layer between the solid deuterium-tritium fuel and the undoped high-density carbon ablator of a NIF-scale implosion. A potential resonance is found between the mixing layer thickness and gravitational (C_s^2/g) and temperature-gradient scale lengths, leading to elevated enthalpy generation. These results suggest that *if* mixing occurs in current capsule designs for the National Ignition Facility, the ignition margin may be appreciably eroded by the associated enthalpy of mixing. The degree of enthalpy generation from mixing of high-Z hohlraum wall material and low-Z gas fills is estimated to be on the order of 100 kJ or more for recent NIF-scale hohlraum experiments, which is consistent with the inferred missing energy based on observed delays in capsule implosion times [1]. [1] O.S. Jones *et al.*, Phys. Plasmas 19, 056315 (2012).

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