

Abstract Submitted
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Plasma Adiabatic Lapse Rates for ICF¹ PETER AMENDT, CLAUDIO BELLEI, SCOTT WILKS — The adiabatic lapse rate (or degree of decreasing temperature with increasing altitude) is a well-known phenomenon in atmospheric physics. An analogous effect in plasma physics or inertial confinement fusion (ICF) exists for an accelerating capsule and leads to self-consistent temperature gradients. An analysis is performed for an adiabatic, binary mixture of fuel ions in an ICF capsule to obtain the plasma analogue of an adiabatic lapse rate. A novel source term for generating a plasma temperature gradient that is proportional to a difference in ionization states between the two species of ions is identified. For high- and low- Z mixtures as in the mix layer between the hydrogen fuel and gold inner shell of an ignition double-shell target or between the ablating gold wall and the low- Z tamping gas (helium) in a hohlraum, an associated strong GVolt/m -scale thermoelectric field is predicted that can promote runaway populations and species separation. The consequences of this analysis on the ICF database are presented.

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