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Energy coupling in axially pre-magnetized triple gas-puff Z-pinches[1] JEFF NARKIS, MAYLIS DOZIERES, DAVID REISMAN, FABIO CONTI, FARHAT BEG, University of California, San Diego — The radial implosion of one or more annular gas-puffs, or liners, onto a central on-axis jet, or target, is an efficient source of X-rays or neutrons, depending on the target material. University-scale gas-puff Z-pinches operate in a low-density regime where thermal conduction effects dominate radiative cooling, thus can significantly affect target stagnation conditions. Though the electron-ion temperature equilibration timescale is large, here we present simulation results using the radiation-MHD code HYDRA that suggest the state of the electron fluid – which we show is significantly altered by the choice of radiation model (local thermodynamic equilibrium, LTE, vs. non-LTE) and degree of axial pre-magnetization – affects the evolution of ion temperature gradients within the liner material. If large ion temperatures can develop at the interface between liner and target plasma, and the target electron Hall parameter is large at peak compression, thermal insulation of both target ions and target electrons can be significant. The implications of these observations are briefly discussed in the context of Z-pinch neutron sources.

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