Abstract Submitted
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Ignition Capsules with Aerogel-Supported DT Fuel for the National Ignition Facility (NIF) and for Reactor Applications[1] DARWIN HO, DAN CLARK, JAY SALMONSON, JOHN LINDL, STEVE HAAN, PETER AMENDT, Lawrence Livermore National Lab — For high rep-rate reactor applications, capsules with aerogel-supported liquid DT fuel ("foam-filled") can have much reduced fill time compared to β-layering. The liquid DT vapor pressure is lowered once liquid DT is imbedded in a foam matrix, and the gas density is consequently closer to the desired density. We present NIF-scale foam-filled capsules in both 1-D and 2-D simulations. For foam density at 0.02 g/cm^3, there is a 9% degradation in the clean 1-D yield if we include 2-D roughness up to a Legendre mode number of 60. This degradation in yield can be partially recovered if the capsule aspect ratio is increased. Optimal configuration is obtained when aspect ratio is increased until the clean fuel fraction is about 70 – 75% at peak velocity. Herrmann scan (in ablator and fuel thickness parameter space) will be presented. We will also present a statistical assessment of the capsule reliability to all expected manufacturing and physics uncertainties between capsules with clean DT fuel and with liquid DT in a foam. The performance of larger foam-filled capsules will also be presented.

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