3D simulations of thermally induced expansion of beryllium microstructure in gas–filled NIF ignition targets\textsuperscript{1} M.M. MARINAK, N.R. BAR- 
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Laboratory — X-ray preheat in the baseline gas-filled NIF ignition target is calcu-
lated to heat solid portions of the beryllium ablator hundreds of degrees Kelvin. 
Anisotropy in the resulting thermal expansion, due to crystal properties, causes the 
interfaces between the beryllium and cryogenic fuel, as well as the internal beryl-
lium interfaces, to distort before the grains are melted by passage of the first shock. 
We quantify these effects for the full duration of the implosion. A 3D polycrys-
talline model is employed in ALE3D, a multiphysics arbitrary Lagrange Eulerian 
code, to calculate this expansion and the response to the first shock. It models the 
anisotropic elastic and plastic response, resolving individual grains. Perturbations 
in the fields and interfaces are then linked to a 3D HYDRA simulation of the re-
mainder of the implosion. High-resolution simulations resolve modes up to $\ell \approx 2000$. 
These perturbations add to those originating from the native roughness on the em-
bedded interfaces. We compare the magnitudes and spectral content of the different 
perturbation seeds.

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