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Isochoric Implosions for Fast Ignition[1] DANIEL CLARK, MAX TABAK, Lawrence Livermore National Laboratory — Various gain models have shown the potentially great advantages of Fast Ignition (FI) Inertial Confinement Fusion (ICF) over its conventional hotspot ignition counterpart. These gain models, however, all assume nearly uniform-density fuel assemblies. By contrast, typical ICF implosions yield hollowed fuel assemblies with a high-density shell of fuel surrounding a low-density, high-pressure hotspot. To realize fully the advantages of FI, then, an alternative implosion design must be found which yields nearly isochoric fuel assemblies without substantial hotspots. Here, it is shown that a self-similar spherical implosion of the type originally studied by Guderley [Luftfahrtforschung **19**, 302 (1942)] may be employed to yield precisely such quasi-isochoric imploded states. The difficulty remains, however, of accessing these self-similarly imploding configurations from initial conditions representing an actual ICF target, namely a uniform, solid-density shell at rest. Furthermore, these specialized implosions must be realized for practicable drive parameters, *i.e.*, accessible peak pressures, shell aspect ratios, etc. An implosion scheme is presented which meets all of these requirements, suggesting the possibility of genuinely isochoric implosions for FI.

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