Section 1
UNIFORMITY CONSIDERATIONS ON OMEGA

Introduction

To propagate a sustained thermonuclear burn, thereby obtaining useful energy production from an inertial confinement fusion (ICF) implosion, spherical pellets containing deuterium-tritium (DT) fuel must be compressed to ~1000 times their liquid density (XLD) and reach central temperatures of ~5 keV.[1] Two approaches to ICF are presently under active research. The first—indirect drive—uses "hohlraum" targets,[2] converting the incident energy of a driver into x rays that in turn drive the pellet implosion. The second approach—direct drive—directly illuminates a pellet with multiple overlapping laser beams, driving the implosion via electron thermal conduction.

It has been generally recognized in the ICF community that the direct-drive approach to inertial fusion offers the potential for greater pellet gain (the ratio of the thermonuclear energy out to the incident driver energy) at lower incident driver energies than the indirect-drive approach.[2] However, it has been claimed that indirect-drive pellets can obtain better drive uniformity than direct-drive pellets without having the driver be uniform or symmetrically arranged.[2] Therefore, only when the more stringent requirements on illumination and drive uniformity for direct-drive pellets are met can the potential for higher gain be obtained.[3] It is this potential, and its associated cost savings in terms of driver-energy requirements, that makes the study of a direct-drive option to ICF important.