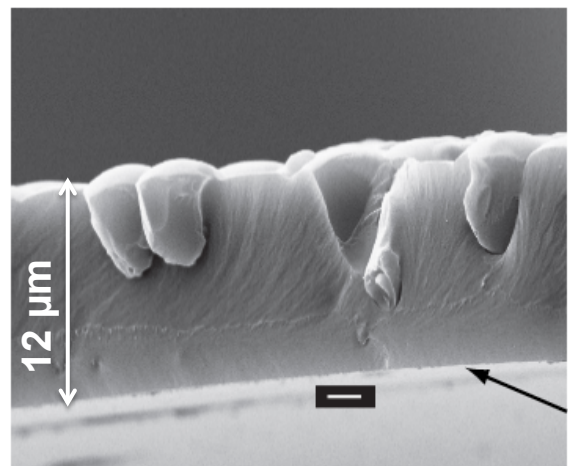
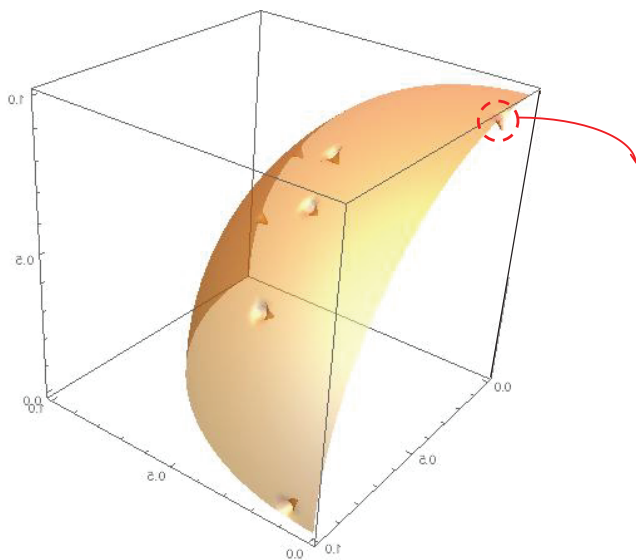


レーザー核融合の燃料容器内部欠陥による核融合点火の消滅 Internal Capsule Defects Quenching Thermonuclear Ignition

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Hydrodynamic instabilities such as the Rayleigh-Taylor (RT) instability may amplify perturbations on the capsule, and finally mix the cold main fuel and the capsule material into the hot spark, thereby quenching thermonuclear ignition in inertial confinement fusion targets. Surface roughness is generally considered as a primary source of the hydrodynamic instabilities, but internal capsule defects (see Fig. 1) can also seed perturbations on the surface, being amplified by the instabilities. It is found by analyzing mode spectra of these defects that the perturbation amplitudes are well above the canonical surface roughness specification. Our mixing calculation for high gain targets suggests that the internal capsule defects in the present level are large enough to quench the thermonuclear ignition. It appears that in order to achieve ignition and burn one should adopt a technique such as density matched emulsion method that is free from the internal defects.



Nikroo, Fusion Technology (1999)
*Stadermann (Private Comm)

Fig. 1 Schematic view of ignition capsule and its interior