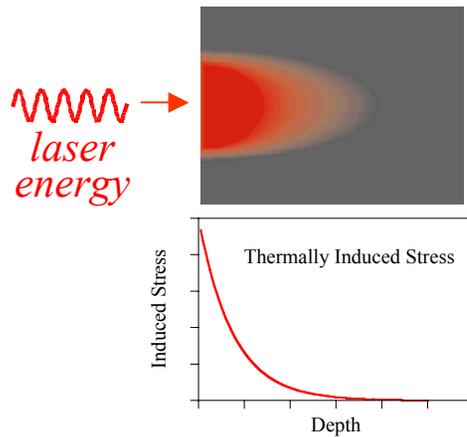


Laser Ablation of Brittle Solids (58600)

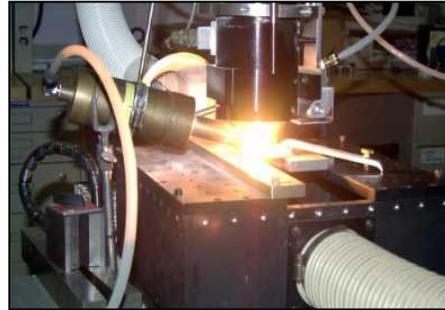
Understanding and controlling energy deposition rates in brittle solids is the key to either promoting efficient ablation or avoiding unwanted damage.

Thermal Shock Ablation Mechanism

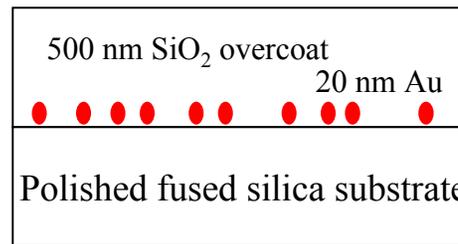


Material ablates when the induced stress exceeds the breaking stress.

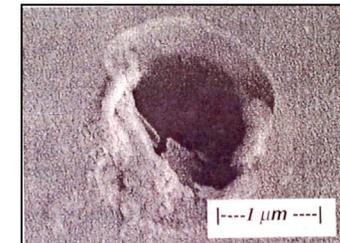
Stress gradients that lead to brittle failure can cause catastrophic damage in laser-irradiated solids. Controlling the gradient is the key to controlling ablation.



Ablating concrete with a high power laser can be an effective means of nuclear decontamination. Intelligent choice of laser parameters is crucial to ensuring the most efficient ablation and obtaining the most benign and easily contained effluent.



Fused silica test specimen



Damage crater in fused silica

Even nanoparticles can be effective damage initiators in high-quality optics. Understanding the damage mechanism is key to designing robust optics for the National Ignition Facility.

