

Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Precision Machined Hohlräum Parameter Study for Inertial Confinement Fusion¹ MATTHEW BARBER, Covenant College, MICHAEL SCHOFF, MARTIN HAVRE, JASON WALL, General Atomics — In support of indirect drive Inertial Confinement Fusion (ICF) research at the National Ignition Facility (NIF), gold or uranium components, called hohlraums, are used to convert laser light into X-rays to drive the fuel-loaded capsule or other experimental packages. These millimeter-scale components with micrometer-scale features are fabricated with a series of diamond turning operations. Any deviation from specification or undesired feature can directly impact the symmetry and overall performance of the capsule implosion. The final quality of the machined parts is dependent on the material being machined, cutting tool material and configurations, as well as a variety of other machining and environmental parameters. A systematic study of these parameters is presented to understand parameter windows and to optimize surface quality, feature dimensional accuracy, tool integrity and longevity, throughput, and burr reduction in hohlraum fabrication.

¹Work supported in part by US Department of Energy under the Science Undergraduate Laboratory Internship (SULI) program and ICF Target Fabrication DE-NA0001808.

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Date submitted: 03 Jul 2019

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