Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

NIF Ignition Targets with Uniformly Cu Doped Berylllium Capsules[1] D.C. WILSON, A.N. SIMAKOV, K. YIRAK, J.L. KLINE, LANL, J.D. SALMONSON, J.L. MILOVICH, D.S. CLARK, D.S. CALLAHAN, S.M. SEPKE, LLNL — The low opacity of beryllium leads to a high, radiation driven, mass ablation rate in the shell of an ICF capsule. Exploitation of this advantage leads to thicker shells using less copper dopant than previously designed. But a relatively harder drive spectrum causes x-ray preheat to the inner beryllium surface that may negate this advantage. Both the mass ablation rate and ablation pressure decrease as dopant is added to protect against this preheat. In a standard design with stepped dopant levels, the ablation front reaches the highest doped layer during the main laser pulse, reducing the drive pressure. An optimal design will ablate as much mass with as little dopant as possible, to drive as heavy a fuel and ablator payload as possible to high velocity. We have explored capsule designs with uniformly doped shells using 0 to 1% copper. As the dopant concentration is lowered the initial shell thickness increases from about 150 to 330μm. An integrated simulation using a 0.25% cu doped shell, a standard U/Au hohlraum, 1.46 MJ laser energy, and a peak laser power of 417 TW calculates to ignite.

[1]Funded by the USDOE

Douglas Wilson
Los Alamos National Laboratory

Date submitted: 28 Jun 2012 Electronic form version 1.4