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Beryllium Ignition Targets for Indirect Drive NIF Experiments[1]
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Current NIF plastic capsules are under-performing, and alternate ablators are being investigated. Beryllium presents an attractive option, since it has lower opacity and therefore higher ablation rate, pressure, and velocity. Previous NIF Be designs assumed significantly better hohlraum performance than recently observed (e.g., 7.5 vs. 15-17% of back-scattered power and 1.0 vs. 0.85 main pulse's power multipliers) and employed less accurate atomic configuration models than currently used (XSN vs. DCA), and thus an updated design is required. We present a new, Rev. 6 Be ignition target design that employs the full NIF capacity (1.8 MJ, 520 TW) and uses a standard 5.75 mm gold hohlraum with 1.5 mg/cm^3 of helium gas fill. The 1051 μm capsule features 180 μm of layered copper-doped (with the maximum of 3 atom-%) Be ablator and 90 μm of cryogenic deuterium-tritium fuel. The peak implosion velocity of 367 μm/ns results in 4.1 keV of no-burn ion temperature, 1.6 and 1.9 g/cm^2 of fuel and total areal densities, respectively, and 20.6 MJ of fusion yield. The capsule demonstrates robust performance with surface/interface roughnesses up to 1.6 times larger that Rev. 3 specs.

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