



NUNO LEMOS

Title: *Target Gain >1 from Inertial Confinement Fusion Implosions at the National Ignition Facility*

Abstract:

The ability to robustly achieve net energy gain >1 from fusion plasmas is a grand scientific challenge and is being pursued via multiple approaches by different institutions around the world. At the National Ignition Facility, a record fusion energy yield of 3.15 MJ, corresponding to a target gain of 1.5 and capsule gain of 12, was produced using the indirectly driven inertial confinement approach in December 2022. Progress toward ignition has been made in steps. First was fuel gain, where the neutron yield exceeds the energy in the deuterium-tritium fuel. Next was “alpha heating,” where the neutron yield is doubled due to the additional energy deposited in the fuel by alpha particle stopping. Then, we achieved the burning plasma state and finally we have now achieved ignition. In this talk I will summarize how ignition was achieved at NIF as well as several key physics principles of inertial fusion.

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