

Plenarvortrag

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Progress towards inertial confinement fusion on the National Ignition Facility — •SIEGFRIED GLENZER — Lawrence Livermore National Laboratory, P.O. Box 808, Livermore, CA 94551, USA

With completion of the National Ignition Facility (NIF) at the Lawrence Livermore National Laboratory the quest for producing a burning fusion plasma has begun. The goal of these experiments is to compress matter to densities and temperatures higher than the interior of the sun to initiate nuclear fusion and burn of hydrogen isotopes. The first inertial confinement fusion implosion experiments with cryogenic fuel layers have recently been fielded. These experiments use mega joule laser energies that compress fusion capsules in indirect drive

hohlraums to test initial hot spot formation and thermonuclear fuel assembly. We applied 0.17 mg of equimolar deuterium-tritium thermonuclear fuel with the potential for ignition and significant fusion yield conditions. Measurements of the implosion core, neutron yield, temperatures and fuel areal density show compression by a factor of 30 to a fuel density approaching 1000 g/cc and hot spot temperature of 3.5 keV. A Lawson-type fusion confinement parameter of more than 10 atm s has been achieved where the comparison with radiation-hydrodynamic simulations indicates that these implosions are within a factor of three required for reaching ignition and high yield. In this talk we will discuss recent findings indicating the path towards further pressure increases in the near future.