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Creating a Star in the Laboratory: The National Ignition Facility

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The National Ignition Facility, completed in 2009, is the world's largest laser. As such it is expected to compress a pellet of ^{2}H and ^{3}H to achieve a temperature exceeding 100 million K and density of up to 1000 g cm^{-3}, both seven times their values at the core of the Sun. These should produce ignition and energy gain. NIF plans to encourage programs in basic research, with nuclear astrophysics being part of that program. This presentation will describe the basic operation of NIF, as well as the motivation for and some details of several nuclear astrophysics experiments that might be conducted at NIF. Finally I will discuss how NIF might impact the world's energy future. This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under contract DE-AC52-07NA27344, LLNL-ABS-416423.