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New Capability for Nuclear Physics and HED Sciences

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NIF is within a year from completion and conducting experiments in inertial confinement fusion (ICF), stockpile stewardship, high energy density (HED) science and nuclear physics. NIF's 192 beams will produce 1.8 MJ at 351 nm, 60 times more than the largest previous lasers. NIF will attempt to demonstrate ICF, by which more fusion energy is released from its ^{2}H-^{3}H target than the NIF laser uses to compress and heat it. NIF's three missions will study matter at extreme conditions: temperatures up to 10^{8}K, densities to 1000 g cm^{-3}, and pressures to 10^{16} Pascals. In fusion events, NIF will produce a neutron density up to 10^{21} cm^{-3}. These conditions occur only in the interiors of stars, in thermonuclear burn, and in supernovae that signal the end of massive stars' lives. NIF's experiments will study the parameter space of ICF as well as experiments in several HED science subfields. NIF facility time and resources will be allocated via a peer review process to be overseen by the NIF user office. This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.