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The Development of ICF and the countdown to ignition experiments on the NIF

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Over three decades of development in Inertial Confinement Fusion are reaching culmination with completion of the National Ignition Facility, expected early in calendar 2009. The first beams will be delivered to target chamber center in October 2007 and Early Opportunity Shot (EOS) experimental campaigns with an increasing number of beams will commence shortly thereafter. The purpose of these campaigns is to begin integrating all of the equipment needed, and demonstrating the performance required, for ignition experiments. This includes the NIF laser, the target cryogenic system, the NIF targets and the NIF target diagnostics. A major campaign with 96 beams (half of NIF's beams) in a symmetric configuration is planned for summer 2008. The purpose of the 96 beam EOS campaign is to pick the hohlraum temperature, laser beam phase plates, and laser energy for the first ignition experiments. This talk will review some of the key physics and technology milestones in ICF over the past three decades, discuss the NIF ignition campaign strategy, and address possible future directions in ICF research. This work was performed under the auspices of the U.S. Department of Energy by University of California, Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.