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OV/1-4: The National Ignition Campaign: Status and Progress

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Since the completion of the National Ignition Facility (NIF) construction project in March 2009, a wide variety of experiments have been completed in support of NIF's mission areas: national security, fundamental science, and fusion energy. NIF capabilities and infrastructure are in place with over 50 X-ray, optical and nuclear diagnostic systems and the ability to shoot cryogenic DT layered capsules. NIF, a Nd:Glass laser facility, has operated routinely at 1.45-1.6 MJ of 3ω light with very high reliability since September 2011 and is on track to reach its design goal of 1.8 MJ and 500 TW of ultraviolet light in 2012. The National Ignition Campaign (NIC), an international effort with the goal of demonstrating thermonuclear burn in the laboratory, is making steady progress toward achieving ignition. Experiments in 2011 demonstrated the ability to achieve densities over 500 g/cm2 utilizing precision pulse shaping, along with neutron yields within a factor of 5-6 of those required for entering the regime of strong alpha particle heating. Experiments in 2012 are being carried to further optimize this performance. Other experiments have been completed in support of high-energy-density science, materials equation of state, and materials strength. In all cases, records of extreme temperatures and pressures, highest neutron yield and highest energy densities have been achieved. This paper will provide status update of the unprecedented experimental capabilities of the NIF and describe the progress achieved so far on the path toward ignition.

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