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The Nike Laser Facility and its Capabilities V. SERLIN, Plasma Physics Division, Naval Research Laboratory, Y. AGLITSKIY, SAIC, McLean, VA, L.Y. CHAN, M. KARASIK, D.M. KEHNE, Plasma Physics Division, Naval Research Laboratory, J. OH, RSI, Lanham, MD, S.P. OBENSCHAIN, J.L. WEAVER, Plasma Physics Division, Naval Research Laboratory — The Nike laser is a 56-beam krypton fluoride (KrF) system that provides 3 to 4 kJ of laser energy on target. The laser uses induced spatial incoherence to achieve highly uniform focal distributions. 44 beams are overlapped onto target with peak intensities up to 10^{16} W/cm^2. The effective time-averaged illumination nonuniformity is $< 0.2\%$. Nike produces highly uniform ablation pressures on target allowing well-controlled experiments at pressures up to 20 Mbar. The other 12 laser beams are used to generate diagnostic x-rays radiographing the primary laser-illuminated target. The facility includes a front end that generates the desired temporal and spatial laser profiles, two electron-beam pumped KrF amplifiers, a computer-controlled optical system, and a vacuum target chamber for experiments. Nike is used to study the physics and technology issues of direct-drive laser fusion, such as, hydrodynamic and laser-plasma instabilities, studies of the response of materials to extreme pressures, and generation of X rays from laser-heated targets. Nike features a computer-controlled data acquisition system, high-speed, high-resolution x-ray and visible imaging systems, x-ray and visible spectrometers, and cryogenic target capability. Work supported by DOE/NNSA.

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