

Abstract Submitted
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Electra: Repetitively Pulsed Angularly Multiplexed KrF Laser System Performance¹ MATTHEW WOLFORD, MATTHEW MYERS, JOHN GIULIANI, JOHN SETHIAN, Plasma Physics Division, U.S. Naval Research Laboratory, PATRICK BURNS, Research Scientific Instruments, FRANK HEGELER, Commonwealth Technologies Inc., REGINALD JAYNES, Science Applications International Corporation — As in a full size fusion power plant beam line, Electra is a multistage laser amplifier system. The multistage amplifier system consists of a commercial discharge laser and two doubled sided electron beam pumped amplifiers. Angular multiplexing is used in the optical layout to provide pulse length control and to maximize laser extraction from the amplifiers. Two angularly multiplexed beams have extracted 30 J of KrF laser light with an aperture $8 \times 10 \text{ cm}^2$, which is sufficient to extract over 500 J from the main amplifier and models agree. The main amplifier of Electra in oscillator mode has demonstrated single shot and rep-rate laser energies exceeding 700 J with 100 ns pulsewidth at 248 nm with an aperture $29 \times 29 \text{ cm}^2$. Continuous operation of the KrF electron beam pumped oscillator has lasted for more than 2.5 hours without failure at 1 Hz and 2.5 Hz. The measured intensity and pulse energy for durations greater than thousand shots are consistent at measurable rep-rates of 1 Hz, 2.5 Hz and 5 Hz.

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