Summary

This system is similar to an OPCPA system. It runs at 2 Hz, and generates 4.5J per pulse at 532 nm, with 6 ns flattop pulse shape.

The initial pulse is sliced out from a 40 mw, 1064nm CW fiber laser by a Mach-Zehnder intensity modulator. Pulse waveforms are created by software, which is implanted into GUI(Graphic User Interface, the software for running the laser system), and then sent to a synthesizer. Electrical pulse formed by the synthesizer drives the modulator. The sliced pulse passes a 5mm head, as a preamplifier, and a 8mm Faraday isolator to a 6mm head. The 6mm head is the gain medium of a regenerate amplifier. After six passes in the regenerator loop the pulse energy increases to about 7 mj. The beam passes an ASE suppression switch, a special filter, and then is relay imaged to pair of 9mm heads, from 9mm heads to a pair of 19mm heads and finally to a pair of 25mm heads. The energy of the pulses reaches about 9.5J at 1064nm. A type II KD*P crystal double the frequency and get 4.8J green pulses. Bench heating pads are installed to every laser head. They all keep on for 24 hours.

Specifications and Performance

	Specifications	Performance
Wavelength	532 nm	532 nm
Repetition rate	2 Hz	2 Hz
Temporal Mode	Single Longitudinal Mode	Single Longitudinal Mode
Energy	4.5j	4.8j
Pulsewidth	6 ns	6 ns +/- 0.1ns
Pulse rise time	<300 ps(10% to 90%)	220 ps
Pulse fall time	<300 ps(10% to 90%)	230 ps
Near field beam profile	Flat top < 15% from mean over central 80% of the beam	Flat Top fit with 11% DEV/Mean over central 80% of the beam
Polarization Contrast Ratio	> 100	> 1000
Energy Stability	<2% (RMS) over one hour	1.0% (RMS) over 7200 shots
Beam Pointing	± 50μrad over 1000 shots	<± 250μrad over 7200 shots
Jitter	<75ps RMS	30ps RMS
1ω/2ω contrast ratio	10000:1	7000:1