

# Intrepid

High Energy Nd:YAG

## Pulse Shaping

Intrepid is a high energy pulsed laser system specifically tailored for pumping OPCPA amplifiers. The output of the laser is shaped to be spatially and temporally flat, uniformly amplifying the input chirped pulse across the entire waveform.

The Intrepid pulse can also be preferentially stressed to adjust for distortions on the seed pulse:

Linear ramp,  $t^3$ , multipulses pattern can be generated.

Intrepid is offered in a variety of output energies from mJ to hundreds of joules.

Pulse duration from 100s ps to 100 ns can be proposed.



## Applications

### Industry:

- > Laser peening

### Science:

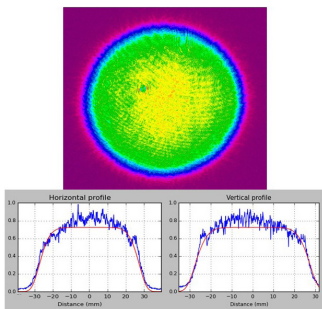
- > OPCPA pumping
- > Laser Driven Dynamic Compression
- > Laser fusion

## Key Features

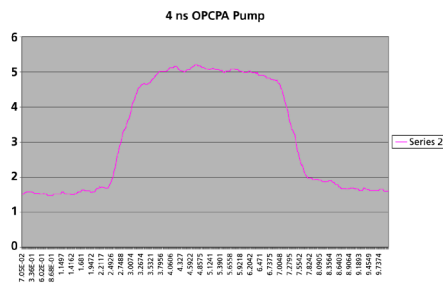
- > Programmable pulsewidths on a standard platform specifically designed for OPCPA pumping
- > Intelligent control architecture for comprehensive system management
- > Intuitive Graphical User Interface
- > Scalable architecture for the most demanding applications
- > Nd:glass versions up to 250 J @ 0.1 Hz @1053 nm and 200 J @ 527 nm are available.

# Specifications (Nd:YAG version)

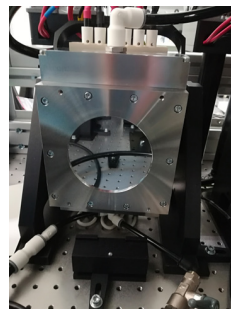
	Intrepid 0	Intrepid I	Intrepid II-A	Intrepid II-B	Intrepid II-C	Intrepid HE
Beam Profile	Round, Supergaussian with $\leq 15\%$ RMS modulations in the central 80% of beam diameter measured at FWHM					
Beam Diameter @ $1/e^2$	~ 6 mm	~ 12 mm	~ 20 mm	~ 26 mm	~ 26 mm	75 mm $\pm$ 2.5 @ 1064 nm 55 mm $\pm$ 2.5 @ 532 nm
Divergence	0.6 mrad	$\leq 0.5$ mrad				
Energy Per Pulse at 1064 nm	$\geq 10$ mJ	$\geq 800$ mJ	$\geq 3000$ mJ	$\geq 5000$ mJ	$\geq 6000$ mJ	Up to 70J for $> 1.5$ ns pulsewidth
Energy Per Pulse at 532 nm	$\geq 5$ mJ	$\geq 550$ mJ	$\geq 2000$ mJ	$\geq 3200$ mJ	$\geq 4000$ mJ	Up to 50J for $> 1.5$ ns pulsewidth)
Long Term Mean Energy Stability	$\leq 5\%$ P-V over 8H	$\leq 3\%$ P-V over 8H (after warm-up time)				
Pulse To Pulse Energy Stability @ 1064 nm	$\leq 2\%$ RMS	$\leq 1.5\%$ RMS				
Pulse To Pulse Energy Stability @ 532 nm	$\leq 2.5\%$ RMS	$\leq 2\%$ RMS				
Pulsewidth FWHM	1 - 8 ns (200 ps to 100 ns on option; Max energy depends on pulse duration)					
Temporal Profile	Flat-top with $\leq 5\%$ RMS modulation over central 80% of the pulsewidth					
Rise / Fall Time	$\leq 300$ ps 20-80% (~ 50 ps on option)					
Jitter RMS	$\leq 30$ ps RMS					
Polarization	Linear					
Pointing Stability	$\leq 50$ $\mu$ rad					
Repetition Rate	Up to 10 Hz			Up to 5 Hz		Up to 10 Hz



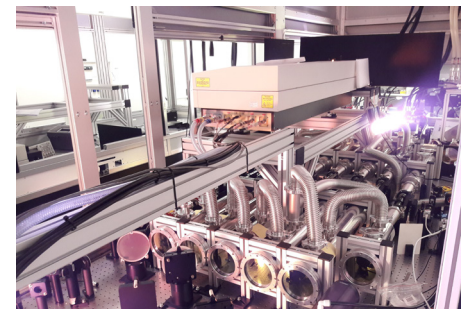
Intrepid Beam Profile at 532 nm



Temporal 4 ns pulse



Pseudo Active Mirror Disk Amplifier Module (PAMDAM) in Intrepid HE



Intrepid HE:  
Intrepid I as a seeder on the top of and up to 6 PAMDAM on the table.

# System Requirements

## Dimensions

Optical Head (L x W x H) <sup>1</sup>	Intrepid I : 2,438 mm x 610 mm x 508 mm (96" x 24" x 20") Intrepid II : 2,438 mm x 1,219 mm x 508 mm (96" x 48" x 20")
Power Supply (LxWxH) <sup>2</sup>	Intrepid I : 622 mm x 711 mm x 1,435 mm (24.5" x 28" x 56.5"), total of 1 Intrepid II : 622 mm x 711 mm x 1,435 mm (24.5" x 28" x 56.5"), total of 2

## Water

Service	1-3 GPM (gallons/minute) at 10 - 40 PSI pressure drop
Temperature	closed loop water to water heat exchanger: external cooling water required, temperature <25° C

## Others

Electrical Service	200 - 240 VAC, single $\phi$ , 50/60 Hz
Room Temperature	18 to 30° C / 65 to 87° F; temp stability $\pm 1^\circ$ C/8hr
Umbilical Length	1.5 m (5 ft)

Notes:

<sup>1,2</sup>The size of optical head and power supplies may vary depending on system requirements.



# Intrepid

*High energy pulsed laser system*



Continuum<sup>®</sup>  
by  Amplitude