



## IMPACT®-4000 SERIES

### Multi-Module / MOPA TEA CO<sub>2</sub> Laser Systems

A range of Multi-module or Master-Oscillator / Power-Amplifier (MOPA)  
TEA CO<sub>2</sub> laser systems

- Higher pulse energies and / or tightly controlled beam properties
- Repetition Rates to 150 pps
- Ultra-short pulse durations (~100 ns)
- Standard options include:
  - Line tuning
  - Adjustable transverse-mode selection, including TEM<sub>00</sub>
  - Single longitudinal-mode (SLM)

### Typical Applications

- Plasma Diagnostics
- Laser Photochemistry
- Optical Damage Studies
- Non-Destructive Testing / Laser UT
- Laser Propulsion and Particle Acceleration

The **IMPACT-4000 Series** lasers are based on LightMachinery's industrially-proven IMPACT-2000 lasers, but modified for ultra-short pulse duration (100 – 200 ns) and low jitter operation as is required in many scientific and some industrial applications.

Available options include:

- Wavelength tuning (manual or computerised)
- Single transverse-mode (TEM<sub>00</sub>) operation
- Single longitudinal-mode (SLM) operation

Some applications require higher pulse energies than can be delivered by single-module Impact-4000 Series laser. In such cases, two or three gain modules can be combined in series within the resonator of a single oscillator.

Other applications require that the laser beam be precisely controlled in mode quality, for example operation on a single or low-order transverse mode. Even more demanding applications require that the laser operate on a single longitudinal mode to achieve a smooth temporal profile and a restricted spectral bandwidth.

In such cases it is generally most efficient to use a 1-module oscillator with tightly controlled beam properties, followed by a series of 1-module or 2-module amplifiers, in some cases doublepassed (Master-Oscillator / Power Amplifier).

LightMachinery can supply a range of standard MOPA configurations with performance tailored to individual customer needs.

## How to define your Impact-4000 Multi-Module / MOPA Laser System:

IMPACT-4XXX<sup>(1)</sup>-OY<sup>(2)</sup>-AZ<sup>(3)</sup>-TM<sup>(4)</sup>-LOM<sup>(5)</sup>-WL<sup>(6)</sup>

- (1) XXX = repetition rate. Choices are 10, 15, 30 and 150 pps (010, 015, 030, 150)  
 (2) Y = number of oscillator modules  
 (3) Z = number of amplifier modules  
 (4) TM = transverse mode. Choices are multimode (MM), TEM<sub>00</sub> (SM) or adjustable aperture (AA)  
 (5) LOM = longitudinal mode. Choices are multi-longitudinal mode (MLM) or single-longitudinal mode (SLM)  
 (6) WL = wavelength range. Choices are fixed line (FL) or line-tunable (LT)

### Examples of Standard Performance:

#### **IMPACT-4010-O2-A0-MM-MLM-FL**

12 J at 10 pps, 2-module oscillator, no amplifier modules, multi-transverse and multi-longitudinal mode, fixed line (10.6 μm)

#### **IMPACT-4010-O1-A4-SM-SLM-LT**

3 J at 10 pps on the stronger lines in each band, 1-module oscillator, 4 amplifier modules, single transverse and single longitudinal mode, line tunable.

For further technical and sales information, please visit our website or contact:

LightMachinery Inc.      lasers@lightmachinery.com  
 80 Colonnade Road      (613) 749-4895  
 Ottawa, Ontario, Canada, K2E 7L2