## YOUR SUPPLIER FOR INNOVATIVE PHOTONIC SOLUTIONS





Laser sources Laser Material Processing solutions Laser Accessories Photonics components Instruments and Systems Imaging and Detection units

## 2022



LAS Photonics expert in Lasers and Photonics is a representative company in the field of Lasers and Electro-Optics providing innovative products and after sales support for the industrial and scientific markets.

We supply a wide range of Lasers sources, Laser Accessories, Laser Machines, Optical Components, Test and Measurement Instruments. The company combines certified engineers qualified in the field of Physics and Electro-Optics with a dynamic and executive team having an extensive experience in the laser industry.

#### Our team



Bernard Azout Managing Director



Johanna Taieb Electro-Optics Sales Engineer



Miki Iluz Technical Sales Engineer & Service Manager



Aharon Shahar Electro-Optics Sales Engineer



Lea Guez Sales Coordiantor

## **TABLE OF CONTENT**

| Solid State Lacore   | л       |
|--|---------|
| Single Frequency Lasors  |         |
| High Energy Bulsod Solid State Lasors  | 4       |
|  | -+<br>5 |
| Figure safe 1 54 um as lasors  | 5       |
| Dve Lasers   | 0<br>7  |
| Tunahle dve laser systems  | 7       |
| Fiber Lasers   | ,<br>8  |
| Supercontinuum Lasers  | 8       |
| Illtrafast low noise femtosecond Lasers                                      | 8       |
| Femtosecond and Picosecond Lasers for LifeScience and Biophotonics           | 9       |
| Femtosecond Industrial Lasers  | 10      |
| MultiKW CW Lasers  | 11      |
| Pulsed ns Lasers   | 11      |
| High Power Diode Lasers  | 12      |
| CW /OCW laser stacks, semiconductor material and mounted diode lasers        | 12      |
| Enitaxy wafers   | 12      |
| CW diodes  | 13      |
| OCW stacks   | 13      |
| Illuminator modules  | 14      |
| Diode pumping modules  | 14      |
| Single Emitter Diode Laser   | 15      |
| Multi-single Emitter Diode Laser   | 15-16   |
| Diode System Laser   | 16      |
| Quantum cascade Lasers   | 17      |
| DFB Lasers   | 18      |
| 1020-1180 nm DFB laser   | 18      |
| 1240-1300 nm quantum dot laser   | 18      |
| Epitaxial wafer on GaAs substrate  | 18      |
| 532, 561, 594nm compact visible lasers                                       | 19      |
| 640-940nm High Power lasers  | 19      |
| Tunable Diode Laser Systems  | 20      |
| Tunable Littrow and Cateye Lasers  | 20      |
| Individual dies/chips, laser modules, laser systems, laser products          | 21      |
| Medical Laser System ML7710  | 21      |
| Plug and Play stand-alone laser products                                     | 21      |
| Low power Fabry Perot/DFB/Customized laser chips / TO-CAN modules/pigtail    | 21      |
| Single-frequency diode lasers in butterfly package/ Visible light Individual | 21      |
| Addressable Bar (IAB)  |         |
| X-Rays cameras   | 22      |
| Adaptive Optics and Deformable mirrors                                       | 23      |
| Adaptative optics for ultra-high intensity lasers                            | 23      |

| Microscopy and Bio-Imaging                                     | 24    |
|--|-------|
| Shack – Hartmann and Hartmann WFS                              | 25    |
| Metrology Systems  | 26    |
| Beam shape products  | 27    |
| Autocorrelator/Beam Profiler/Mini Imaging Spectrometer         | 27    |
| Autocorrelator   | 27    |
| Mini Imaging Spectrometer                                      | 27    |
| Beam Profiler  | 27    |
| Laser Wavemeter  | 28    |
| Lock-in Amplifiers/Impedance Analyzers/Waveform Generator      | 28    |
| High Power Fiber components                                    | 29    |
| High Power Pump Combiner – Nx1 Pump Combiner                   | 30    |
| High Power Pump Signal Combiner – (N+1)x1 Pump signal Combiner | 30    |
| High Power Signal/Beam Combiner                                | 31    |
| Active Fiber Combiner  | 31    |
| NxM Combiner Splitter  | 31    |
| 1µm 300mW -2W Low Power Optical Isolator                       | 32    |
| 1µm 10W -100W High Power Optical Isolator                      | 32    |
| 1550/2000nm High Power In-Line Optical Isolator                | 32    |
| Cladding Power Stripper  | 33    |
| Mode Field Adaptator   | 33    |
| Non Linear crystals (LBO, KTP, RTP cells, PPLN)                | 34    |
| MgO:PPLN Crystals  | 34    |
| PPLN Waveguides  | 34    |
| Laser crystals (ND:YAG, Er:YAG, CTH:YAG)                       | 35    |
| Motorized laser attenuators and Beam expanders                 | 36    |
| Motorized laser beam expnaders MEX                             | 36    |
| Motorized laser attenuators                                    | 36    |
| Nanosecond/picosecond/femtosecond laser machines               | 37-38 |
| Laser Rangefinders and LIDAR sensors                           | 39    |
| OEM Laser Rangefinders for Defense & Security applications     | 39    |
| High-Speed Cameras   | 40    |
| i-Speed 2 Series Cameras                                       | 40    |
| i-Speed 5 Series Cameras                                       | 40    |
| i-Speed 7 Series Cameras                                       | 41    |
| UV LED   | 42    |
| UV Curring Lamps   | 42    |
| UV Chamber   | 42    |
| Accessories for laser diodes                                   | 43    |
| Service and Support  | 44    |

## SOLID STATE LASERS

### Single Frequency Lasers

**Unik Lasers** develops, designs, and manufactures narrow linewidth and single frequency, continuous wave DPSS lasers from the UV to NIR at mid- to high power outputs.

#### Application examples:

Serie

Duetto

Raman Spectroscopy, Holography & Imaging, Quantum Technology, Fluorescence, Lithography.

**Output power** 

50 mW

10-1000 mW

 
 Solo
 640 nm 1064 nm
 10-1000 mW 10 - 2000 mW
 ≤ 0.5 MHz

### High Energy Pulsed Solid State Lasers

Wavelength

349 nm

532 nm

**Litron Lasers** has a unique offering of laser cavity configurations (cavity super-Gaussian, stable multimode cavity or telescopic cavity "true-TEM00") in diode pumped lasers, flashlamp pumped lasers to adapt to each need.

#### Application examples:

PIV & Visualisation, Spectroscopy & LIBS, Scientific Research

|                      | Flashlamp pumped lasers  | Diode pumped lasers |  |
|----------------------|--|---------------------|--|
| Wavelength           | 212, 266, 355, 523, 526, 532, 1047, 1053, 1064 nm  |                     |  |
| Rep. rate            | 0 to 100 Hz  | 0 to 300 Hz         |  |
| Pulse energy / Power | mJ to 10 J   | mJ to 1 J           |  |
| Pulse width          | 3 to 10 ns   | Sub ns to 20 ns     |  |
| Spatial Mode         | TEM00, multimode, super-Gaussian cavity  |                     |  |
| Options              | Design without cooling water, OPO, double pulse for PIV,<br>single-frequency transmission, transmission duration ps<br>up to 8 MHz |                     |  |

Spectral

Bandwidth

 $\leq 0.5 \text{ MHz}$ 

**Spatial** 

Mode

TEM00

TEM00



Coherence

Length

> 100 m

> 100 m

Litron Lasers





## **SOLID STATE LASERS**

#### ns- ps Lasers

Bright Solutions offers a wide range of Pulsed DPSS lasers.

#### **Application examples:**

Micromachinig of glass, LIDAR, Non-linear Spectroscopy

| Name      | Wavelength                            | Pulse<br>energy | Average Output<br>power (W)    | Pulse<br>width | Rep. rate                 |
|-----------|---------------------------------------|-----------------|--------------------------------|----------------|---------------------------|
| ONDA      | 266, 355,<br>532, 1064nm              | > 0.8mJ         |                                | 2ns -<br>10ns  | Single shot to<br>100kHz  |
| SOL       | 1064, 532nm                           |                 | 40W@1064nm<br>10W@532nm        | 6ns -<br>80ns  | > 200kHz                  |
| WEDGE     | 266, 355,<br>532, 1064nm              | > 4mJ           |                                | 500ps -<br>3ns | Single Shot to<br>100 kHz |
| VENTO     | 1064, 532nm                           |                 | > 100W @1064nm<br>> 50W @532nm | <300ps         | > 200kHz                  |
| ONE DPSS  | 1µm                                   | > 100µJ         | > 3W                           | 10ns -<br>20ns | > 30kHz                   |
| Microchip | 1064, 532,<br>355, 266,<br>946, 473nm | > 100µJ         |                                | 350ps -<br>3ns | 1Hz-100kHz                |





5

## SOLID STATE LASERS

#### Eye- safe 1,54 µm ns lasers

**Optogama** is a high-tech company that designs, develops and commercializes custom and unique laser products.

Optogama team designs and manufactures a variety of "eye-safe" 1,54 µm diode pumped passively qswitched erbium glass laser transmitters.



**OPTOGAMA** 

#### Application examples:

LIDAR & laser ranging, LIBS, Metrology and instrumentation, Automotive

| Name      | Wavelength | Pulse<br>energy       | Energy Stability             | Pulse<br>duration |
|-----------|------------|-----------------------|------------------------------|-------------------|
| Kaukas 1  | 1534nm     | 1 mJ                  | 1 to 5 Hz                    | < 10ns            |
| Kaukas 2  | 1534nm     | > 2 mJ                | < 2% @1 Hz per<br>300 pulses | < 14ns            |
| Kaukas 3  | 1534nm     | > 3 mJ                | 0,5 to 1 Hz                  | < 12ns            |
| Kaukas HR | 1535nm ± 5 | > 30 μJ or<br>> 45 μJ | 1 kHz or 100 Hz              | < 7ns             |

## **DYE LASERS**



#### **Tunable dye laser systems**

**Liop-Tec** supplies widely tunable dye laser systems delivering laser radiation from the UV (197 nm) to the IR (5  $\mu$ m), dye laser amplifiers and laser accessories

#### Application examples:

Laser-induced fluorescence: LIF, Photolysis, Ombustion & Atmospheric studies, Light detection and ranging: LIDAR, Raman spectroscopy, Coherent anti-Stokes Raman spectroscopy: CARS



|                | LIOPSTAR, LIOPSTAR -E   |
|----------------|---|
| Linewidth      | down to 0,02 cm-1   |
| Spectral range | 197nm – 5000nm  |
| ASE            | < 0,5%  |
| Features       | <ul> <li>friendly LabView Software</li> <li>intelligent PI control for FCU autotracking unit</li> <li>USB port</li> <li>remote control via TCP / IP protocol</li> </ul>   |
| Comments       | <ul> <li>third dye cell for high power pump laser</li> <li>highly efficient laser resonator</li> <li>exchangeable grating</li> <li>near Gaussian beam quality due to Bethune cells</li> <li>eroded stainless steel case for oscillator and<br/>amplifier cells</li> <li>new state-of-the-art integrated electronics and<br/>user temperature stabilized crystals</li> <li>smallest footprint</li> </ul> |

## **FIBER LASERS**

#### Supercontinuum Lasers

**YSL Photonics** explores, develops and manufactures nextgeneration of supercontinuum source (supercontinuum laser, white light source, white light laser) for a diverse range of industrial and R & D applications.

#### Application examples:

OCT, Fluorescence Spectroscopy and Microscopy, Nanophotonics, Super-Resolution Imaging

| Name         | Wavelength<br>range | Total Power        | Repetition<br>rate               | Visible power      | Pulse<br>width |
|--------------|---------------------|--------------------|----------------------------------|--------------------|----------------|
| SC-Pro       | 430 –<br>2400nm     | > 8 W              | 10 kHz –<br>80 MHz<br>Adjustable | >1000 mW           | ~100 ps        |
| SC-Pro-<br>M | 410 –<br>2400nm     | > 1.5 W - > 7<br>W | 10 kHz -<br>80MHz                | > 0.5 W - > 2<br>W | ~6 ps          |

#### Ultrafast low noise femtosecond laser

Menhir Photonics offers innovative ultrafast laser solutions.

<u>Application examples:</u> Frequency-comb, Spectroscopy, Quantum

|                   | MENHIR -1550<br>(Oscillator without amplifier)                                | MENHIR -1550+<br>(Oscillator<br>withamplifier) |  |
|-------------------|---|--|--|
| Average power     | > 50mW  | > 2W   |  |
| Peak power        | 0.1kW   | > 4kW  |  |
| Pulse energy      | 0.05nJ  | > 1nJ  |  |
| Repetition rate   | 216, 250 MHz, 1, 1.25, 2 or 2.5 GHz<br>Custom design: from 200 MHz to 2.5 GHz |  |  |
| Center wavelength | 1555 ± 10nm   |  |  |
| Pulse width       | < 250fs, Transform limited  |  |  |











# Femtosecond and Picosecond Lasers for LifeScience and Biophotonics

**Spark Lasers** develops compact femtosecond and picosecond lasers for industrial and scientific applications, combining innovative technology, high performance, high quality, compact modern design and reliability..

#### Application examples:

Bioimaging, Neurosciences, Non-linear optics



| Name    | Wavelength<br>(nm) | Output<br>power (W) | Pulse energy<br>(µJ)           | Pulse<br>width           | Rep. rate                     | Q-<br>switch<br>type |
|---------|--------------------|---------------------|--------------------------------|--------------------------|-------------------------------|----------------------|
| Antares | 1030, 1064         | 10, 20, 30          | 0.125, 0.250,<br>0.375, 0.500  | 10ps                     | 80MHz                         | Active               |
| Sirius  | 532, 1064          | 2, 5                | 32, 60                         | 10ps                     | Single shot<br>to 1MHz        | Active               |
| Alcor   | 920, 1064          | 1, 2, 4, 5          | 0.025, 0.050,<br>0.062, 0.0125 | 100, 110<br>and<br>130fs | 80MHz<br>(Optional:<br>40MHz) | Active               |

## **FIBER LASERS**

#### **Femtosecond industrial Lasers**



**Amplitude** is the international specialist and leader in femtosecond lasers for industrial, medical and scientific applications. Combining research & innovation and industrial efficiency.

<u>Application examples:</u> Industry: Micro Processing, Semiconductor Science: Cellular Imaging, Neuroscience/Optogenetic, Spectroscopy Medical: Ophthalmology



| Name      | Central<br>Wavelength (nm) | Average<br>power    | Energy per<br>pulse         | Repetition<br>rate               | Pulse<br>width     |
|-----------|----------------------------|---------------------|-----------------------------|----------------------------------|--------------------|
| SATSUMA   | 1030 ± 5                   | >5W -<br>>50W       | > 10μJ - ><br>40μJ / 150 μJ | From single<br>shot to<br>40 MHz | < 350fs -<br>>10ps |
| TANGOR    | 1030 ± 5                   | > 50W to ><br>300 W | > 300µJ -<br>> 3mJ          | From single<br>shot to<br>40 MHz | < 500fs -<br>>10ps |
| GOJI      | 1030 ± 5                   | > 5W                | > 125nJ -<br>>500nJ         | 10 to 40 MHz                     | <150fs             |
| YUJA      | 1030 ± 5                   | > 10W               | >100µJ                      | From single<br>shot to<br>40 MHz | < 500fs            |
| TANGERINE | 1030 ± 5                   | > 20W -<br>50W      | >250µJ                      | From single<br>shot to<br>40 MHz | < 350fs -<br>10ps  |
| MIKAN     | 1025 ± 5                   | > 1,3W              | >24nJ                       | 54 MHz                           | < 250fs            |

**TRUMPF** is the market and technology leaders in machine tools and lasers for industrial manufacturing, and work with our innovations in almost every sector.

#### Multi CW lasers

Application examples:

Cutting, Welding, , Fine cutting, Additive manufacturing, Ceramic scribing

| CW fiber lasers - TrueFiber P Compact Series |  |  |  |  |
|--|--|--|--|--|
| Laser Power at the LLK Plug                  | 100 – 2000W                              |  |  |  |
| Typical Power Constancy at Rated<br>Power    | ± 2 % (peak)                             |  |  |  |
| Continuously Adjustable Power<br>Range       | 10 – 300W                                |  |  |  |
| Beam Quality                                 | 0.38 ±0.003 mm•mrad<br>to 13 ± 4 mm•mrad |  |  |  |
| Wavelength Spectrum                          | 1068 – 1082nm                            |  |  |  |
| Diameter of Laser Light Cable                | 10 – 100µm                               |  |  |  |
| Length of the Laser Light Cable              | 5 – 20m                                  |  |  |  |



#### **Pulsed ns lasers**

Application examples:

Ablation, Cleaning, Drilling, Engraving, Marking, Micro-machining

| ns fiber laser - TruePulse Nano Series |               |  |  |
|--|---------------|--|--|
| Average Output power                   | 20 – 200W     |  |  |
| Maximum Peak Pulse Power               | > 7 - >50kW   |  |  |
| Beam Quality (M <sup>2</sup> )         | < 1.3 - 6     |  |  |
| Wavelength Spectrum                    | 1059 – 1065nm |  |  |
| Maximum Pulse Energy                   | > 0.6 – 5mJ   |  |  |
| Pulse Duration Range                   | 3 - 2000ns    |  |  |
| Pulse Repetition Frequency             | 1 – 4000kHz   |  |  |





# CW / QCW laser stacks, semiconductor material and mounted diode lasers



**Jenoptik** develops and produces high-power diode lasers – ranging from semiconductor material, Mounted Diode Lasers and laser stacks to fiber-coupled diode laser modules.

#### Application examples:

Medicine: Laser based therapy for ophthalmology, dermatology and aesthetics Material processing / Direct diode laser application: Welding, soldering, hardening and annealing



| Laser Bars / C   |  |  |
|--|--|--|
| Wavelength 760, 792, 808, 880, 905, 915, 940, 976, 1020,1060,<br>(nm) 1470 |  |  |
| Output Power<br>(W)  | 20 - 2400  |  |
| Operation<br>mode  | CW / QCW   |  |
| Cooling  | actively cooled/passively cooled   |  |
| Collimation  | fast axis/ fast axis and slow axis / without / couplage<br>fibre 200μm-600μm for diode laser modules |  |

#### **Epitaxy wafers**

**Jenoptik** provides custom design epitaxial wafer structures for a variety of optoelectronic devices operating in the 630 nm – 1200 nm spectral range.

#### <u>Application examples</u>: Medicine, Material processing / Direct diode laser application and Optical pumping





**Lumibird** manufactures a wide range of laser diodes and laser diode module: QCW diode stacks, CW laser diode modules, fiber coupled QCW diode stacks, short pulse laser diode illuminators, as well as high brightness diode source, IALDA, and pulsed power supply drivers for QCW diodes.

#### **CW diodes**

<u>Application examples:</u> Optical Pumping, Medicine, Industry

| Wavelength (nm)  | Output power (W)                                 |  |  |  |
|--|--|--|--|--|
| 800-980  | >500W per 10mm bar<br>5mm and 3mm also available |  |  |  |
| 1532   | >50W per 10mm bar                                |  |  |  |
| 1550   | >50W per 10mm bar                                |  |  |  |
| 1560   | >50W per 10mm bar                                |  |  |  |
| Other Wavelengths Available<br>Wavelength Agnostic Technology! |  |  |  |  |



#### QCW stacks

Application examples:

Ablation, Engraving, LIBS, LIDAR, Surface treatment, Spectroscopy, Marking, Pumping

| Wavelength<br>(nm)   | Output power (W)                                       | Efficiency |  |  |
|--|--|------------|--|--|
| 808-980  | Up to 500 W per 10mm bar<br>5mm and 3mm also available | >65%       |  |  |
| 1532 >50W per 10mm bar   |  | >25%       |  |  |
| 1550   | >50W per 10mm bar                                      | >25%       |  |  |
| 1560   | >50W per 10mm bar                                      | >25%       |  |  |
| Other Wavelengths Available<br>Wavelength Agnostic Technology! |  |            |  |  |





#### **Illuminators modules**

#### Application examples:

Ultrasound generation, Photoacoustics, NIR spectroscopy, 3D flash LIDAR, Time of flight



|  | Short pulses          | Ultra compact | Ultra short pulses               |
|--|-----------------------|---------------|----------------------------------|
| Output Energy  | 0.5 - 1.5mJ           | 1 - 4mJ       | 1 - 50µJ                         |
| Pulse width  | 10 - 15ns             | 30 - 100ns    | 2 - 10ns                         |
| Pulse repetition rate                                    | >1kHz                 | >10kHz        | >640kHz                          |
| Wavelength   | 808, 915, 940, 980 nm |               | 808, 905, 1370,<br>1470, 1550 nm |
| Fast & Slow axis<br>divergence ( without<br>collimation) | Typ. 35° by 9°        |               | FA (3 to 35°) by<br>SA (9°)      |

#### **Diode pumping modules**

| Wavelength   | ngth Output power   |      |  |  |
|--|---|------|--|--|
|  | Based on QCW stack technology                               |      |  |  |
| 800-980nm  | QCW: Up to 500 W per 10mm bar<br>5mm and 3mm also available | >65% |  |  |
| 1532nm   | >50W per 10mm bar   | >25% |  |  |
| 1550nm   | >50W per 10mm bar   | >25% |  |  |
| 1560nm   | >50W per 10mm bar   | >25% |  |  |
| Other Wavelengths Available<br>Wavelength Agnostic Technology! |   |      |  |  |



**BWT** develops various diode laser products with wavelength from 405nm to 1470nm, output power from 2mW to 4000W, and integrated functions like aiming beam, internal TEC, fiber sensor etc..

#### **Single Emitter Diode Laser**

Application examples:

*Fiber laser pumping ,computer to plate (CTP), DPSS laser pumping, medical use, aiming beam, industry.* 

For different applications, varieties of packages with optional functions of aiming beam, photo detector, TEC, fiber detector, thermistor and other functions are available.



#### **Mult-Single Emitter Diode Laser**

<u>Application examples:</u> Illumination, Scientific research, Material processing, 3D printing







## **HIGH POWER DIODE LASERS**



| Wavelength | Туре   | Output power (W)                       | Output          |
|------------|--|--|-----------------|
| 445nm      | Multi-Emitter                                | 10, 15, 20, 50                         | Multimode Fiber |
| 635nm      | Multi-Emitter                                | 5                                      | Multimode Fiber |
| 793nm      | Multi-Emitter                                | 8, 12, 16, 30, 50, 80, 90              | Multimode Fiber |
| 808nm      | Multi-Emitter                                | 15, 25, 30, 60, 150                    | Multimode Fiber |
| 878nm      | Multi-Emitter, Volume<br>Bragg Grating (VBG) | 30, 65, 120                            | Multimode Fiber |
| 888nm      | Multi-Emitter, Volume<br>Bragg Grating (VBG) | 65, 120                                | Multimode Fiber |
| 915nm      | Multi-Emitter                                | 30, 70, 150, 200                       | Multimode Fiber |
| 976nm      | Multi-Emitter                                | 15 , 20, 30, 70, 150, 200, 330,<br>540 | Multimode Fiber |
| 976nm      | Multi-Emitter, Volume<br>Bragg Grating (VBG) | 18, 27, 60, 100, 140, 180, 400         | Multimode Fiber |

#### **Diode System Laser**

Application examples: Laser Pumping , Medical, Material processing, Scientific Research, 3D printing etc.

| Wavelength (nm) | Output power<br>(W)                 | Operation mode  | Core diameter/ Numeric<br>Aperture |
|-----------------|-------------------------------------|-----------------|------------------------------------|
| 635             | Up to 5                             | CW or Modulated | 4/9/105μm<br>0.22NA                |
| 808             | Up to 150                           | CW or Modulated | 105/200/400μm<br>0.22NA            |
| 9xx             | 1-400                               | CW or Modulated | 105/135/200/400μm<br>0.22NA        |
| 915/976         | 1000-4000                           | CW or Modulated | 220/600/800µm                      |
| 915/980         | 60-200                              | CW or Modulated | 105/135/200μm<br>0.22NA            |
| 635/808/915/980 | 0.4, 2, 4, 8, 10,<br>15, 20, 30, 50 | CW/QCW          | 105/200/300/400μm<br>0.22NA        |



Tel: +972 (0) 3 632 63 77 | info@lasphotonics.com | www.lasphotonics.com



**mirSense** is committed to developing and making cuttingedge laser technologies.

Quantum cascade lasers are an advanced technology, resulting from the conquest of space, precise at the atomic scale.



| Wavelength          | Power  | Product line                                       | Options   |
|---------------------|--------|--|---|
| ~4.0µm              | >1W    |  |   |
| ~4.6µm              | >1W    | •<br>PowerMir high-power<br>QCL pulsed lasers<br>• | <ul> <li>Plug-and-play turnkey system</li> <li>OEM system</li> <li>(lasor+clostropics board)</li> </ul> |
| ~4.8µm              | >1.5W  |  | <ul> <li>HHL-packaged laser</li> <li>Laser chips</li> </ul>   |
| ~9.5µm              | >200mW |  |   |
| 10 to 17<br>microns | <20mW  | UniMir CW QCL lasers                               | HHL-packaged laser  |



**QD Laser** delivers laser-based solutions to customers in a broad range of fields, including telecommunications, manufacturing, medicine and consumer products. new semiconductor.

#### 1020-1180 nm DFB laser

#### Application examples:

Seeder for high power laser: Micromachining, LiDAR, Semiconductor inspection equipment

| Pulse Width  | Wavelength                 | Peak Power<br>(Pulsed) | Optical<br>Power (CW) |
|--------------|----------------------------|------------------------|-----------------------|
| 15ps         | 1030nm<br>1064nm           | >50mW                  | n/a                   |
| 50ps, 1-20ns | 1024-1120nm<br>1180nm      | >100mW                 | n/a                   |
| 1-20ns       | 1030nm<br>1053nm<br>1064nm | >300mW<br>>400mW       | n/a                   |
| CW           | 1024-1120nm<br>1180nm      | n/a                    | >30mW                 |



#### 1240-1300 nm quantum dot laser

#### Application examples:

Silicon photonics, Underground resources exploration (175-200°C)

| Wavelength | Туре | Form         | Output<br>Power (mW) |
|------------|------|--------------|----------------------|
| 1300nm     | FP   | Chip, TO-CAN | >10                  |
| 1300nm     | DFB  | Chip, TO-CAN | >10                  |
| 1240nm     | DFB  | Chip, TO-CAN | >10                  |



#### **Epitaxial wafer on GaAs substrate**

| Wavelength  | Туре               | Form  |  |
|-------------|--------------------|-------|--|
| 1120-1310nm | Epitaxial<br>wafer | Wafer |  |

#### 532, 561, 594nm compact visible lasers

#### Application examples:

Biomedicine: Flow cytometry, Fluorescence microscopy



|                                  |                             | Standard type   | Fiber pigtailed<br>type                   | CW driver<br>integrated BOX |
|----------------------------------|-----------------------------|---|---|-----------------------------|
| V                                | /avelength                  | 532, 561, 594nm   | 532, 561nm                                | 532, 561,<br>594nm          |
| Li                               | ght output                  | Free space  | Optical fiber                             | Free space                  |
| Outpu<br>t<br>power<br>5<br>swit | CW to 100 MHz               | 532nm: 20, 30mW<br>561nm: 5, 20, 30,<br>50mW<br>594nm: 5, 20mW                    | SMF/PMF:<br>15mW<br>MMF: 25mw             | 20mW<br>CW only             |
|                                  | 50ps Gain<br>switching mode | 50ps Gain switching<br>mode   | 532nm: 20mW<br>561nm: 50mW<br>594nm: 20mW | n/a                         |
| Required instruments             |                             | <ul><li>Current sources: 2 units</li><li>Temperature controller: 1 unit</li></ul> |   | PC                          |

#### 640-940nm High Power lasers

#### Application examples:

Particle counter, Leveler, Machine Vision, LiDAR, Biomedical equipment, Color Projector, Visible Light Communication

| Wavelength | Output Power<br>(mW) | Operating<br>Temperature °C |  |
|------------|----------------------|-----------------------------|--|
| 640-940nm  | 30-250               | -10-70                      |  |





#### **Tunable Littrow and Cateye Lasers**

**MOGLabs** is a company of in-the lab scientists and engineers that focus on developing scientific instrumentation from a researcher perspective.

#### Application examples:

Laser cooling and trapping, Bose-Einstein condensation, Quantum optics: squeezed light, Electromagnetic transparency and slow light, Time and frequency standards, Laser spectroscopy



|                        | Littrow Laser - LDL  | Cateye Laser - CEL   |
|------------------------|--|--|
| Wavelength             | 368nm to 1612nm  | 450 – 530nm; 630 – 1620nm  |
| Output power           | Up to 250mW  | Up to 250mW  |
| Linewidth              | diode dependent  | diode dependent  |
|                        | Typically <200kHz, diode dependent<br>Modulation - 20MHz bandwidth, AC<br>or DC coupled, 20ns latency RF bias<br>tee option: >2.5GHz bandwidth | Typically 2.5GHz bandwidth AC or DC coupled, 2.5GHz bandwidth        |
| Coarse tuning<br>range | Up to 50nm for single diode  | Diode dependent; e.g. 776nm –<br>802nm or 850 – 895nm (single diode) |

## INDIVIDUAL DIES/CHIPS, LASER MODULES, LASER SYSTEMS, LASER PRODUCTS

**Modulight** designs and manufactures lasers and optics for personalized medicine and better life. They provide supporting laser solutions like system integration service and laser design & manufacturing.

#### Application examples:

Wavelength

**Output Power** 

Operation mode

**Fiber optics** 

*Biomedicine: Oncology, Genetics and Ophthalmology/ Quantum computing, lidar, digital printing, , 3D sensing, Diagnostics, displays* 

#### Medical Laser System ML7710

Clinical laser system platform, suitable for various medical applications, **ML7710** can house up to 8 lasers optionally with aiming beams. Each laser can be individually configured with a graphical touchscreen interface.

#### Plug and Play stand-alone laser products

#### Mutli-wavelength laser sources ML 6600

**ML6600** is a small plug-and-play laser system for users that don't have time or interest for all the complexity with drivers, cooling, power supplies, etc. Just unbox it, and take into use!

#### Single-wavelength laser source ML 6500

**ML6500** is a laser system which contains one builtin laser. ML6500 includes all necessary electronics, wrapped up in a conveniently small package.

ML6500 is controlled by a PC software or directly by analog/digital signals.

400-2000 nm

1mW to 10W

CW / QCW / Pulsed

Single mode / Multimode

### Low power Fabry Perot/DFB/Customized laser chips / TO-CAN modules/pigtail

| Single-frequency diode lasers in butterfly package/ |  |
|---|--|
| /isible light Individual Addressable Bar (IAB)      |  |
|   |  |











**Advacam's** imaging cameras are direct conversion single photon counting pixel detectors that represent the cutting edge of current radiation imaging technology. The technology allows material specific information to be displayed in colors.



#### Application examples:

Non-Destructive Testing, Small Animal Spectral Imaging, X-ray diffraction



| Model                            | Characteristics                            | Speed                     | Size               |
|----------------------------------|--|---------------------------|--------------------|
| ADVA <i>PIX</i> TPX3             | Fast Spectral<br>Imaging Camera            | 40M hits/s                | 65K pixels         |
| MINI <i>PIX</i> TPX3             | Miniaturized<br>Spectral Imaging<br>Camera | 2.35M hits/s or<br>16 fps | 65K pixels         |
| WIDE <i>PIX</i> 2(1)X5 -<br>MPX3 | Industrial<br>Spectral Imaging<br>Camera   | 20 (50) fps               | 655 (328) K pixels |
| WIDE <i>PIX</i> 10X10            | Custom Large<br>Area Imaging<br>Camera     | 10 fps                    | 6.5M pixels        |

## **ADAPTATIVE OPTICS and DEFORMABLE MIRRORS**

## Adaptative optics for ultra-high intensity lasers

precise wavefront sensors and adaptive optics solutions.

**Imagine Optic** is a company specializing in wavefront expertise. It has a strong engineering and R&D culture providing ultra-

ILAO Star is the first stepper-motor deformable mirror dedicated to ultra-intense lasers that can perform wavefront correction during full-power operation. Its customizable design will perfectly fit any laser caracteristics.

| Example          | Angle ofCorrectionIncidenceBeam Size |                                | Number of actuators |
|------------------|--------------------------------------|--------------------------------|---------------------|
| ILOA STAR 50     | <10°                                 | Circular, Φ 22<br>mm           | 19                  |
| ILOA STAR<br>100 | 5°                                   | Circular, Φ 30<br>mm           | 37                  |
| ILOA STAR<br>200 | 45°                                  | Elliptical, Φ 80 ×<br>110 mm   | 37                  |
| ILOA STAR<br>400 | 45°                                  | Rectangular, Φ<br>140 × 200 mm | 52                  |

#### Wavetune Perfect loop control for imperfect wavefronts

Unique application that seamlessly combines wavefront measurement and correction features with extensive instrument diagnostics.



23





#### **Microscopy and Bio-Imaging**

## imagine **C**optič



MIRAO 52E Optimized for closed-loop operations

Mirao 52e deformable mirror offers an exceptionally large stroke and high optical quality combined with low power consumption. It incorporates 52 electromagnetic actuators and provides an exceptional 50 µm PV deformation amplitude.



MIRAO 52ES For long-term wavefront stability

The exceptional feature of Mirao 52es deformable mirror is its long-term stability in an open-loop mode, with typical drift of less than 10 nm RMS after 12 hours and up to 3 days.



MICAO 3DSR High Resolution 3D for SMLM

MicAO 3DSR is the first plug & click adaptive optics device dedicated to 3D single molecule localization microscopy techniques.



#### AO KIT BIO

AOKit Bio is a set of adaptive optics components composed of a wavefront sensor, either HASO4 First or HASO4 SWIR, a deformable mirror or phase modulator, and WaveTune adaptive optics software

## imagine **( )**optič

#### Shack – Hartmann and Hartmann WFS

#### Metrology application examples:

High spatial sampling frequency, Very large dynamic range, Freeform optics characterization, Aspheric optics characterization, High spatial frequency aberrations







| Product<br>name        | Absolute<br>Accuracy<br>(RMS<br>λ/n) | Repea-<br>tability<br>(RMS λ/n) | Microlens<br>number | Pupil Size<br>(mm²) | Max<br>Freq<br>(Hz) | Wavelength<br>(nm)       |
|------------------------|--------------------------------------|---------------------------------|---------------------|---------------------|---------------------|--------------------------|
| HASO Lift<br>272       | 100                                  | 200                             | 50 x 68             | 5.2 x 7.0           | 20                  | 400-800                  |
| HASO Lift<br>680       | 100                                  | 200                             | 126 x 170           | 10.21 x 13.78       | 30                  | 400-800                  |
| HASO<br>SWIR           | 100                                  | 200                             | 32 x 40             | 7.44 x 9.30         | 150                 | 900-1700                 |
| HASO<br>SWIR<br>1550   | 35                                   | 70                              | 32 x 40             | 3.60 x 4.5          | 99                  | 1500-1600                |
| HASO4<br>Broadban<br>d | 100                                  | 200                             | 50 x 68             | 5.2 x 7.0           | 20                  | 350-1100                 |
| HASO4<br>126 VIS       | 100                                  | 200                             | 126 x 170           | 10.21 x 13.7        | 30                  | 400-800                  |
| HASO4<br>FIRST         | 100                                  | 200                             | 32 x 40             | 3.6 x 4.6           | 99                  | 400-1100( <sup>3</sup> ) |
| HASO4<br>FAST          | 100                                  | 200                             | 16 x 16             | 1.19 x 1.19         | 1000                | 400-900                  |
| HASO EUV               | 50                                   | 200                             | 72 x 72             | 13 x 13             | 1                   | 4-40                     |
| HASO HXR               | 10                                   | 30                              | 150 x 150           | 3 x 3               | 10                  | 0.05-0.25 (5-<br>25 keV) |

Tel: +972 (0) 3 632 63 77 |

info@lasphotonics.com |

### **METROLOGY SYSTEMS**

## imagine **( )**optič

R-Flex2 is the second generation of our versatile optical metrology system that instantly combines any of our HASO4 wavefront sensors in the 400 - 1100 nm range with a collimator and a light source.

The R-FLEX2 SWIR metrology system is the second generation of our versatile optical metrology system in the 1000-1700 nm range. It instantly combines our HASO4 SWIR or HASO4 SWIR 1550 wavefront sensors with a collimator and a light source.

The R-Flex LA is the collimating platform that extends the capabilities of the HASO R-Flex2 to large optics and optical surfaces. The output collimated beam size ranges from 30 to 150 mm.

The R-Flex LA is the collimating platform that extends the capabilities of the HASO R-Flex2 SWIR to large optics and optical surfaces. The output collimated beam size ranges from 30 to 150 mm.





## **BEAM SHAPE PRODUCTS**

**Cailabs** has mastered light shaping so that it can design, manufacture and sell innovative photonic products for free-space transmission, industrial lasers, local area networks (LANs) and telecommunications.

#### Application examples:

Space, Aeronautics, Defense, Laser Machining, Local networks, Telecom networks, Energy







CANUNDA solution provides high-power continuous or pulsed beam shaping to boost all kinds of laser machining processes

## TILBA-ATMO

optical receiver is designed to improve the reliability of free-space optical links in the presence of atmospheric turbulence or pointing errors

#### TILBA-EMIT optimally combines several optical sources in a coherent manner, to increase their range and accuracy

## AUTOCORRELATOR / BEAM PROFILER /MINI IMAGING SPECTROMETER

**Femto Easy** products are designed to provide accurate and reliable measurements, whatever the experimental conditions. They can yield proper measurements without caring about the accuracy of the alignment.



#### Autocorrelator

| Model type          | Single-Shot / Multi-Shot                              | 1 10        |
|---------------------|---|-------------|
| Use case            | Single pulses and repetitive pulses / Repetitive puls | es Merere O |
| Pulse duration      | 5 – 1500fs  |             |
| Spectral range (nm) | 480 – 2100 / 700 - 900 Ti:Sa / 1020 - 1080 Yb         |             |

#### **Mini Imaging Spectrometer**

Spectral range: 240 – 1100nm



#### **Beam Profiler**

**Spectral range:** 375 – 1100nm / 190 – 1100nm with UV option



Tel: +972 (0) 3 632 63 77 | info@lasphotonics.com | www.lasphotonics.com





**MOGLabs** is a company of in-the lab scientists and engineers that focus on developing scientific instrumentation from a researcher perspective.



Fizeau wavemeter (FZW)

a compact wavelength measurement device based on Fizeau interferometers, providing reliably accurate measurements over a wide range of wavelengths (400-1100nm) without recalibration.



**Economical Wavemeter (MWM)** 

clearly reveals multimode laser operation, making it particularly suitable for use with external cavity diode lasers and atom cooling and trapping experiments.

## LOCK-IN AMPLIFIER / IMPEDANCE ANALYZER / WAVEFORM GENERATOR

**Zurich Instruments** is a test and measurement company headquartered in Zurich, Switzerland, developing and selling measurement instruments.

#### Lock-in Amplifier MFLI 500 kHz / 5 MHz

- DC 500 kHz / 5 MHz, 60 MSa/s, 16 bits
- Current and differential voltage inputs
- Plug & Play with embedded LabOne<sup>®</sup> Web Server

#### Impedance Analyzer MFIA 500 kHz /5 MHz

- 1 mHz to 5 MHz, 1 m $\Omega$  to 1 T $\Omega$
- Fast and accurate measurements
- Ideal fit for DLTS, MEMS and ESR & ESL applications

#### Arbitrary Waveform Generator HDAWG 750 MHz

- 2.4 GSa/s, 16 bits, 750 MHz signal bandwidth
- 5 Vpp maximum amplitude
- Scalable up to 144 output channels
- Highest channel density available
- Less than 50 ns trigger-to-output delay



Zurich

Instruments

#### Arbitrary Waveform Generator UHFAWG 600 MHz

- Dual 600 MHz arbitrary waveform generator
- 14-bit resolution, 2 markers per channel
- 128 MSa waveform memory per channel
- Amplitude modulation with internal and external phase reference
- Two 600 MHz signal inputs with oscilloscope and optional demodulation, pulse counter, boxcar averager
- Cross-trigger engine for low-latency triggering and sequence branching.

## moglabs



**LightComm Technology** is an innovative leader in the field of passive fiber optic components. LightComm provides technology-leading optical component solutions for the Fiber Laser, Sensor, Medical and Telecom industries.





#### **High Power Pump Combiner – Nx1 Pump Combiner**



Typical Product Highlight:

| Configuration | Input Fiber    | Output Fiber       | Power Handling | Efficiency |
|---------------|----------------|--------------------|----------------|------------|
| 2x1           | 105/125 0.15NA | 105/125 0.22NA     | ≤200W/Port     | >90%       |
| 7x1           | 105/125 0.15NA | 200/220 0.22NA     | ≤v200W/Port    | >90%       |
| 7x1           | 200/220 0.22NA | 20/400 0.08/0.46NA | ≤1000W/Port    | >98%       |
| 19x1          | 105/125 0.15NA | 400/440 0.22NA     | ≤200W/Port     | >97%       |
| 19x1          | 105/125 0.22NA | 20/400 0.8/0.46NA  | ≤200W/Port     | >99%       |
| 37x1          | 105/125 0.22NA | 20/400 0.8/0.46NA  | ≤200W/Port     | >98%       |

#### High Power Pump Signal Combiner – (N+1) x1 Pump Signal Combiner

Typical Product Highlight:

| Configurati<br>on | Pump Fiber        | Input Fiber            | Output<br>Fiber        | Power<br>Handling | Efficienc<br>Y |
|-------------------|-------------------|------------------------|------------------------|-------------------|----------------|
| (2+1)x1           | 105/125<br>0.22NA | x/125<br>SCF/DCF       | y/125 DCF<br>y/250 DCF | ≤200W/Port        | >90%           |
| (2+1)x1           | 105/125<br>0.22NA | x/250<br>SCF/DCF       | y/250 DCF<br>y/400 DCF | ≤200W/Port        | >90%           |
| (2+1)x1           | 200/220<br>0.22NA | x/250<br>SCF/DCF       | y/250 DCF<br>y/400 DCF | ≤200W/Port        | >90%           |
| (6+1)x1           | 105/125<br>0.22NA | x/125<br>SCF/DCF       | y/250 DCF<br>y/400 DCF | ≤200W/Port        | >98%           |
| (6+1)x1           | 200/220<br>0.22NA | x/250 DCF<br>x/400 DCF | y/400 DCF              | ≤1000W/Por<br>t   | >98%           |
| (18+1)x1          | 105/125<br>0.22NA | x/125<br>SCF/DCF       | y/250 DCF<br>y/400 DCF | ≤200W/Port        | >97%           |



#### High Power Signal/Beam Combiner

Typical Product Highlight:

| Configuration | Input Fiber | Output Fiber          | Power Handling   | Efficiency |
|---------------|-------------|-----------------------|------------------|------------|
| 3x1           | 20/400 DCF  | 100/120/360<br>0.22NA | Up to 1500W/Port | >97%       |
| 3x1           | 25/400 DCF  | 100/120/360<br>0.22NA | Up to 1500W/Port | >97%       |
| 4x1           | 20/400 DCF  | 100/120/360<br>0.22NA | Up to 1500W/Port | >97%       |
| 4x1           | 25/400 DCF  | 100/120/360<br>0.22NA | Up to 1500W/Port | >97%       |
| 7x1           | 20/130 DCF  | 100/120/360<br>0.22NA | Up to 800W/Port  | >97%       |
| 7x1           | 25/250 DCF  | 100/120/360<br>0.22NA | Up to 200W/Port  | >97%       |

#### **Active Fiber Combiner**

#### Features:

- Output fiber to be active fiber (only available in side pump scheme)
- Eliminate splicing difficulty between passive and active fiber
- Reduce heating issue at splicing point
- Increase signal isolation to pump channel



#### **NxM Combiner Splitter**

#### Features:

- Used for sensing application in electric power and illumination aerospace etc.
- Excellent total transmission efficiency and beam splitting uniformity
- High power handling capability and high reliability



#### 1µm 300mW – 2W Low Power Optical Isolator

Typical Product Highlight:

| Operating<br>Wavelength | Polarization | Power<br>Handling | Insertion Loss<br>(1mW/Max.<br>Power) | Isolation<br>Bandwidth/<br>Peak Isolation |
|-------------------------|--------------|-------------------|---------------------------------------|---|
| 1064nm±5nm              | non-PM       | 500mW             | ≤2.0/2.2dB                            | ≥30/38dB                                  |
| 1064nm±5nm              | non-PM       | 2W                | ≤2.2/2.6dB                            | ≥28/35dB                                  |
| 1064nm±5nm              | PM           | 300mW             | ≤2.0/2.2dB                            | ≥30/38dB                                  |
| 1064nm±5nm              | PM           | 1W                | ≤2.2/2.6dB                            | ≥28/35dB                                  |

#### 1µm 10W – 100W High Power Optical Isolator

**Typical Product Highlight:** 



| Operating<br>Wavelength | Configuration                  | Power<br>Handling | Insertion Loss<br>(1mW/Max.<br>Power) | Isolation<br>Bandwidth/<br>Peak Isolation |
|-------------------------|--------------------------------|-------------------|---------------------------------------|---|
| 1064nm±5nm              | In-Line                        | 10-100W           | ≤1.2dB                                | ≥28/35dB                                  |
| 1064nm±5nm              | Fiber in, Free space<br>out    | 10-100W           | ≤0.5dB                                | ≥28/35dB                                  |
| 1064nm±5nm              | Fiber in, Beam<br>expander out | 10-50W            | ≤0.5dB                                | ≥28/35dB                                  |

### 1550/2000nm High Power In-Line Optical Isolator



Typical Product Highlight:

| Operating<br>Wavelength  | Polarization | Power<br>Handling | Insertion Loss<br>(1mW/Max.<br>Power) | Isolation<br>Bandwidth/<br>Peak Isolation | Fiber Type                   |  |
|--|--------------|-------------------|---------------------------------------|---|------------------------------|--|
| 1550nm   | PM & non-PM  | 500mW             | ≤0.3dB                                | ≥30dB                                     |                              |  |
| 1550nm   | PM & non-PM  | <5W               | ≤0.4dB                                | ≥30dB                                     | SMF-28e<br>PM 1550           |  |
| 1550nm   | non-PM       | 5-10W             | ≤0.5dB                                | ≥30dB                                     |                              |  |
| 2000µm   | PM & non-PM  | 500mW             | ≤1dB                                  | ≥30dB                                     | SM28e,                       |  |
| 2000µm   | PM & non-PM  | <5W               | ≤1dB                                  | ≥20dB                                     | SM1950,<br>PM1950,<br>PM1550 |  |
| Tel: +972 (0) 3 632 63 77   info@lasphotonics.com   www.lasphotonics.com |              |                   |                                       |   |                              |  |



#### **Cladding Power Stripper**

Typical Product Highlight:

| Fiber Type             | Stripping<br>Efficiency | Stripping Power<br>Handling | Package Cooling<br>Type |
|------------------------|-------------------------|-----------------------------|-------------------------|
| PM or non-PM x/125 DCF | >20dB                   | <40W                        | Passive Cooling         |
| PM or non-PM x/250 DCF | >17dB                   | <200W                       | Passive Cooling         |
| PM or non-PM x/250 DCF | >17dB                   | 200-800W                    | Direct Water Cooling    |
| PM or non-PM x/400 DCF | >17dB                   | <200W                       | Passive Cooling         |
| PM or non-PM x/400 DCF | >17dB                   | 200-800W                    | Direct Water Cooling    |

#### **Mode Field Adaptator**

Typical Product Highlight:

| МҒА Туре               | Input Fiber<br>(PM/non-PM) | Output Fiber<br>(PM/non-PM) | Insertion Loss |
|------------------------|----------------------------|-----------------------------|----------------|
| Forward (Small-Large)  | x/125                      | y/125                       | ≤0.5dB         |
| Forward (Small-Large)  | x/125                      | y/250                       | ≤0.5dB         |
| Forward (Small-Large)  | x/125                      | y/400                       | ≤0.5dB         |
| Backward (Large-Small) | y/125                      | x/125                       | ≤0.7dB         |
| Backward (Large-Small) | y/250                      | x/125                       | ≤0.7dB         |
| Backward (Large-Small) | y/400                      | x/125                       | ≤0.7dB         |

## NON LINEAR CRYSTALS (LBO, KTP, RTP cells, PPI N)

#### Non-linear crystals and Electro-optic Products

Cristal Laser is a technology leader that grows and fabricates non-linear optical crystals such as LBO, KTP, KTA, and RTP crystals for electro-optics.

#### **Non-linear Optics**

- LBO crysral
- KTP / KTP.fr
- KTA crystal
- RTP crystal

#### Application examples:

Green and UV high power industrial lasers, Green lasers for Ti:Sapphire pumping, OPA/OPCPA applications, Biophotonics & medical lasers

#### **Electro-optic Products**

- RTP Pockels ceel
- RTP pairs
- RTP modulator

Application examples: Phase-modulation, Single-frequency lasers, Amplitude modulation

**Covesion** has more than 20 years' experience in the research, development and manufacture of commercial PPLN solutions...

#### **MgO:PPLN Crystals**

Covesion's Magnesium-doped Periodically Poled Lithium Niobate (MgO:PPLN) crystals offer high efficiency wavelength conversion for visible and midinfrared applications.

#### **PPLN Waveguides**

34

PPLN waveguides facilitate highly efficient and cost-effective frequency conversion, providing a route to accessing wavelengths that are presently unavailable from commercial laser sources.

Select from our range of PPLN waveguide chips for the highest conversion efficiencies or our packaged PPLN waveguides for instant connectivity and rapid integration.







(Covesion





## LASER CRYSTALS (ND:YAG, Er:YAG, CTH:YAG)

## CRYSLASER

#### **Laser Crystals**

**Cryslaser** grows large diameter YAG series crystals using the Czochralski technique, including Nd:YAG, Nd:Ce:YAG, Cr4+:YAG, Yb:YAG, Er:YAG and undoped YAG.

#### Nd:YAG

- High gain
- Low threshold
- High efficiency
- Low loss at 1.06um
- Good thermal conductivity and thermal shock characteristics
- Mechanical strength
- High optical quality

#### Er:YAG

- Very high slope efficiency
- Operates well at room temperature
- Operates in a relatively eye-safe wavelength range

#### **CTH:YAG**

- High slope efficiency
- Pumped by flash lamp or diodes
- Operates well at room temperature
- Operates in a relatively eye-safe wavelength range







## MOTORIZED LASER ATTENUATORS and **BEAM EXPANDERS**

**Optogama** is a high-tech company that designs, develops and commercializes custom and unique laser products.

Application examples: Precise laser micromachining, Research

### Motorized laser beam expanders MEX

#### **Compact motorized laser beam expanders MEX**

Highest beam pointing stability (< 0,1 mrad) All-in-one design with integrated controller Two lenses simultaneous movement assuring no misfocus Absolute encoder (both lenses) Adjustment time <1s (all magnifications) Fused silica optical elements No homing after switching on/off Diffraction limited performance for all magnification

#### High-power motorized beam expanders MEX-HP

High power optical design (up to 200 W @ 1030 nm, 500 fs, 1 Mhz) No internal reflections on optical elements High beam pointing stability <0,2 mrad All-in-one design with integrated controller Two lens simultaneous movement assuring no misfocus Absolute encoder (both lenses) Fused silica optical elements Diffraction limited performance for all magnifications

#### Motorized laser attenuators

Clear input



Power

|                                  | aperture | aperture | attenuation range | Available Coatiligs  |
|----------------------------------|----------|----------|-------------------|--|
| Motorized<br>laser<br>attenuator | ø18 mm   | Ø18 mm   | 0,1 - 98%         | 1064 nm, 1030 nm,<br>532 nm, 515nm,<br>355 nm, 343 nm,<br>custom |
|                                  |          |          |                   |  |

**Clear output** 







## NANOSECOND/PICOSECOND/FEMTOSECOND LASER MACHINES

**Lasea** is manufacturing a large range of micromachining workstations starting with compact nanosecond or picosecond lasers to high precision, flexible femtosecond laser machines with robot option for applications such as cutting, drilling, texturing, engraving, marking, welding and thin layer removal. LASEA applies its expertise in many demanding industries such as luxury (watch making and jewellery), medical devices manufacturing, pharmaceuticals, electronics, automotive, R&D centers,... The company is located in Belgium, in France, in Switzerland and in the United States.

#### **OPTEC LightShot LSV3**

#### UV Excimer Catheter Processing Workstation

Versatile, robust and easy to use, the LightShot V3 (LSV3) makes it possible to bring laser processing in-house and reduce manufacturing costs, without the need for a skilled technician.

#### OPTEC ECHO 360: FINE-WIRE, UV LASER STRIPPER A turnkey workstation from the A-thermal laser experts

Throughput equal to multiple mechanical & chemical stripping stations. Residue-free ablation of most polymers and other coating materials. No handling or wire rotation needed for perfect results every time.





#### LS2

#### Easy, reliable, ultra compact

Designed for the marking of small parts, the LS2 workstation is a class 1 machine for bench mounting. Its robust design (welded mechanical structure) enables operation in the most demanding of environments. It allows for nanosecond or picosecond lasers integration with a simple "plug and play" installation.

#### LS3

#### The ultra-compact machine

Specifically designed for micirmachining applications in an industrial environment and integrates Lasea's complete range of laser sources. It is compact, robust, modular and flexible machine thanks to its multiple options that allows micromachining applications with high quality.



Tel: +972 (0) 3 632 63 77 | info@lasphotonics.com |

www.lasphotonics.com

## NANOSECOND/PICOSECOND/FEMTOSECOND LASER MACHINES



#### The accurate, compact, modular, upgradeable micromachining machine



LS4

The LS4 has been specifically designed for micirmachining applcations in an industrial environment and integrates Lasea's complete range of laser sources. It is a modular and flexible machine thanks to its options developed to reach extreme prcisions.

The 3D version allows micromachining of complex 3D pieces thanks to the combination of mechanical axis and optical axis movements.

#### LS5 The flexible machine for high precision micromachining

High precision work can be achieved with no risk of external disturbance thanks to its granite structure and external enclosure perfectly isolated from the internal structure. The LS5 can include all kinds of laser sources (some of the most powerful of the market), including femtosecond sources of micromachining, or even multiple lasers for more flexibility. The 3D version allows micromachining of complex 3D pieces thanks to the combination of mechanical axis and optical axis movements. The integration of a robot in the enclosure 9or externally) combined with a double-head make it an ideal machine for production environments.



#### SPECIAL LASER MACHINES

The laser machine that you need. With an experienced partner.



The Lasea laser systems have been specifically designed for simple and rapid integration into our workstations or the specific environments of our customers, for which we can design an appropriate solution.

## LASER RANGEFINDERS AND LIDAR SENSORS



#### **OEM Laser Rangefinders for Defense & Security applications**

**SensUp** is an innovative affiliated company of the Lumibird Group which designs, manufactures and commercializes LiDARs and laser range finders.

#### Application examples:

*Defense, 3D mapping, Preventive industrial maintenance, Topography, Environment, Wind sensing / wind measurement, UAS/UAV/RPAS/MAV* 



|                   | <b>LRF 905 SR</b><br>OEM mini Laser<br>Altimeter for UAVs | <b>LRF 1550 MR</b><br>Military qualified and<br>industrialized Laser<br>Rangefinder | <b>LRF 1550 SR+</b><br>Monochannel & fully<br>fibered OEM Laser<br>Rangefinder |
|-------------------|---|---|--|
| Wavelength        | 905nm   | 1556nm  | 1556nm   |
| Detection range   | 50m*  | 14,5km*   | 8km*   |
| Accuracy          | 5cm   | 50cm  | 50cm   |
| Measurement rate  | 20Hz  | 1/5/25Hz**  | 1/5Hz**  |
| Dimensions/weight | 55x45x42mm / 42g  | 113x81x72mm /<br>680g   | 119x70x36mm /<br>260g  |
| Consumption       | 2,5W  | 5W  | 5W   |
| Eye Safety class  | 1   | 1/1M/3B   | 1/1M   |

\* On cible with 0,2 albedo

\* On NATO target, with 0,3 albedo, 20 km visibility

\*\* Depending on laser class

## **HIGH SPEED CAMERAS**

iX Cameras is a world-leading technology and product company specializing in the field of high-speed (slow motion) imaging. Based on proprietary innovative technologies, we design, build and sell cuttingedge ultra-fast cameras and software for a wide range of advanced scientific research applications

#### i-SPEED 2 Series Cameras

Ultra Compact Slow Motion Digital Cameras

#### Application examples:

Speed

Pixel Size

Storage

Light sensitivity

Mono/Color

Slowing down most life science, autocrash testing, robotics and machinery applications.



8 μm<sup>2</sup>

2GB / 4GB / 8GB /

16GB

1,200 / 1,000

#### i-SPEED 5 Series Cameras

Perfect Balance Between Speed, Size and Memory Application examples: DIC, PIV, motion analysis

14 µm²

2GB / 4GB / 8GB

2,500 / 2,000



13.7 μm<sup>2</sup>

8GB / 16GB

6,400 / 5,000

|   | 508                           | 510                   | 513                   |  |  |
|---|-------------------------------|-----------------------|-----------------------|--|--|
| Resolution/<br>Frames Per<br>Second*                | 8.3GP/s                       | 10.3GP/s              | 13.2GP/s              |  |  |
| Speed   | 3,980 fps @ 1920x1080         | 4,980 fps @ 1920x1080 | 6,382 fps @ 1920x1080 |  |  |
| Max Frame Rate                                      | vlax Frame Rate 1,000,000 fps |                       |                       |  |  |
| RAM   | 8/36/72/96/144 GB             |                       |                       |  |  |
| Light sensitivity Mono (Gain off/on) 16,000/125,000 |                               |                       |                       |  |  |
| Light sensitivity Color (Gain off/on) 4,000/32,000  |                               |                       |                       |  |  |
|   |                               |                       |                       |  |  |

\*Resolution @ 1920X1080



## **HIGH SPEED CAMERAS**



#### **i-SPEED 7 Series Cameras**

Highest Resolutions, Fastest Speeds Available



#### Application examples:

*PIV, DIC, fluid dynamics, ballistics and a wide range of scientific research.* 

|   | 717  | 721  | 727   |  |
|---|--|--|---|--|
| Resolution/<br>Frames Per<br>Second*                | 17GP/s   | 21GP/s   | 27.1GP/s  |  |
| Speed   | 5,315 fps @ 2072 x<br>1536<br>7,960 fps @ 1920 x<br>1080   | 6,642 fps @ 2072 x<br>1536<br>9,944 fps @ 1920 x<br>1080 | 8,512 fps @ 2072 x<br>1536<br>12,742 fps @ 1920 x<br>1080 |  |
| Max Frame<br>Rate                                   | 2.45 million fps   |  |   |  |
| RAM   | 36 / 72 / 96 / 144 /       36 / 72 / 96 / 144 / 288GB         192 / 288GB       36 / 72 / 96 / 144 / 288GB |  |   |  |
| Light sensitivity Mono (Gain off/on) 16,000/125,000 |  |  |   |  |
| Light sensitivity Color (Gain off/on) 4,000/32,000  |  |  |   |  |

\*Resolution @ 2072X1536



**UWAVE** designs and manufactures innovative, powerful, and easy-to-use UV curing LED lighting systems for photonics, cosmetics, electronics, medical, chemical or high-tech industries.

Today UWAVE diversifies itself and proposes new solutions for other markets such as fluorescence or UVC disinfection.

#### **UV Curing Lamps**

UV LED spotlight curing systems deliver an optimized curing energy on a very precise point. They can be used manually by an operator or integrated into a high-speed automated assembly line.

UV LED linear light curing systems deliver high curing energy for high-speed processes. Their length can be adapted depending on the conveyor belt and the energy needed.



The UV LED curing lamp choice will differ according to insolation surface size, UV power/energy & controlling mode needed.

#### **UV Chamber**

The **UV CHAMBER**<sup>™</sup> is an easy-to-use UV LED irradiation oven suitable for a wide range of applications: curing, bonding, photolithography or photoaging.

Thanks to its ergonomic design, the **UV CHAMBER™** gives you full control over your UV insolation processes and a great repeatability. You will be able to tune the time, the power of the illumination as well as the working distance.

These combined features make the **UV CHAMBER™** the ideal UV LED irradiation oven for semi-automatic UV curing processes or R&D lab work.



# Aero

**AERODIODE** offers flexible optoelectronics solutions in the following 4 categories: laser diode drivers (CW, low noise, pulsed laser diode drivers); fiber-coupled laser diode sources; fiber intensity modulators and SOA pulsed drivers; synchronization electronics (pulse delay generator, pulse picker, AWG); and laser diode reliability test systems.



**Drivers** 

- CW drivers
- Pulsed drivers
- Multi Channel
- High power solutions
- Drivers for fiber lasers
- TDLAS Gas sensing
- Ultra-low noise driver



#### Synchronization tools

- Pulse delay generator
- Pulse picker
- Digital delay generator
- AWG
- Burst shaper
- Voltage converter



#### Modulators

- Fiber-coupled AOM
- Pulsed SOA Driver
- Fiber Optic Modulator (SOA-based)



#### **Test systems**

Laser diode qualification and reliability test system in CW or pulsed regime.



We have a dedicated service team of Engineers to assist and support our customers. Our well trained staff provides installation, repair and equipment maintenance either in our Laboratory or on site.

We also offer validation loan equipment or tests in our laboratory with demonstration equipment as well as customer training.

