

HiPoLas[®]

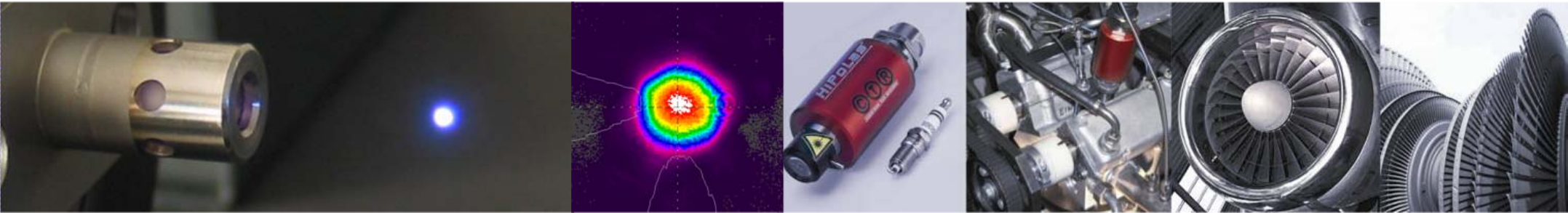


Patented

**High Power Laser
diminutive size - huge potential**



Compact diode-pumped solid state laser for harsh environment



CTR introduces a novel, diode-pumped solid state laser. Originally developed for the ignition of fuel/air mixtures in the harsh environment of motors and other combustion chambers, this laser sets new standards in robustness and offers high power in an exceptionally compact design. Suitable for applications requiring a high-power laser source in compact form, CTR's HiPoLas fulfills industrial requirements on operating reliability at elevated temperature and/or vibration levels.

Laser Type

- DPSS - Diode pumped solid state laser
- Passive Q-switch
- Monolithic resonator
- Laser class 4

Features

- Compact design
- Rugged IP54 housing
- Temperature and vibration resistant
- No internal dealignment in operation
- High focal power density
- External/internal trigger (jitter <math>< 1\mu\text{s}</math>)
- Standard C-mount interface
- Liquid cooling
- Optional Peltier cooling for low pulse frequencies
- Optional fiber connector for diagnostics or fast pulse triggering
- Optional QCW operation without Q-Switch

Technical Specifications

- | | |
|-----------------------|--|
| ■ Laser medium | Nd:YAG |
| ■ Q-switch | Cr:YAG |
| ■ Pump source | Laser diode array |
| ■ Laser Wavelength | 1064 nm |
| ■ Beam Diameter | ≤ 2 mm @ laser aperture |
| ■ Nominal Power | 3 W @ 100 Hz |
| ■ Pulse Width | typ. 2-3 ns |
| ■ Pulse Energy | typ. 30 mJ |
| ■ Multiple pulses | e.g. 3×10 mJ, (dependent on Q-switch) |
| ■ Repetition rate | ≤ 100 Hz liquid cooling
≤ 20 Hz Peltier cooling |
| ■ Ambient temperature | 10 - 125°C |
| ■ Expected lifetime | $> 10^9$ pulses |
| ■ Focal power density | $> 10^{12}$ W/cm ² |

HiPoLas Applications

- Plasma Ignition
- Thermal ignition
- LIBS - Laser Induced Breakdown Spectroscopy
- LIPS - Laser Induced Plasma Spectroscopy
- Engraving & Marking
- Surface Cleaning
- ...

LIBS/LIPS

Laser Induced Breakdown Spectroscopy (LIBS) is an analytical method for the determination of the composition of materials. A laser evaporates a small portion of the sample surface, simultaneously exciting it to a plasma state. The light emitted by this plasma spark is spectrally analyzed, yielding a both qualitative and (semi-) quantitative elemental analysis.

LIBS is a frequently used tool, both in the laboratory and in the field for minimally destructive analyses of e.g. environmental, mineralogical (analysis of stone or ore samples), metallurgical (analysis and quality control of alloys), life science, forensic and security-related samples.

Currently, the availability of compact, cost-effective laser sources is one key limiting factor for mobile, decentralized LIBS systems. Applying a compact, robust, diode pumped high-power laser would be a significant advantage, in particular for field and in-line process applications.

Engraving & Marking

CTR's laser is also suitable as a laser source for various engraving and other material marking applications, on metal, ceramics, plastics, or for interior graving of transparent materials (glass, plastics).

There is a choice of several effects where the laser beam meets the surface: material abrasion by vaporization, thermal color change or photo chemical color change.

Due to its high pulse energy CTR's laser is particularly suitable for challenging surface marking applications which are material and color dependent.

Surface Cleaning

HiPoLas lasers are potential candidates for depainting, cauterizing of lenses or applications where e.g. objects of art have to be cleaned by ablating overlying layers without damaging the object below. This application requires a focused laser source of high power, that can be brought to the object and used to treat small areas according to specific need. The compactness and mobility of CTR's laser makes them highly attractive for such tasks.

Customization

CTR offers to customize its lasers to customer specific needs. This comprises any adaption, from simple mechanical mountings up to modification of beam parameters and even new, application-optimized laser designs. Please, feel free to contact us for discussing your particular requirements. We are also open for new innovative ideas and special applications to be developed!

CTR has years of experience in the development of small, robust & powerful laser sources and related systems.

Ask for your customized application!



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Relevant Patents:
WO2005/028856 / EP1519038
WO2007/143769 / AT503451
EP1919043 / AT503819
EP1519039

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