

Newsletter Février 2011

Sapphire LP Lasers go to high Powers

Cher Client,

In May 2001 at the Conference on Lasers and Electro-Optics in Baltimore (Maryland/ USA) Coherent introduced the first optically pumped semiconductor laser (OPSL) under the brand name Sapphire™ LP. This continuous-wave laser provided 20mW at 488nm. It was the first commercially available all-solid-state laser at this wavelength. In August 2001 a 10mW Sapphire LP at 460nm followed. The start of an exciting and pioneering technology and of the replacement of ion lasers.

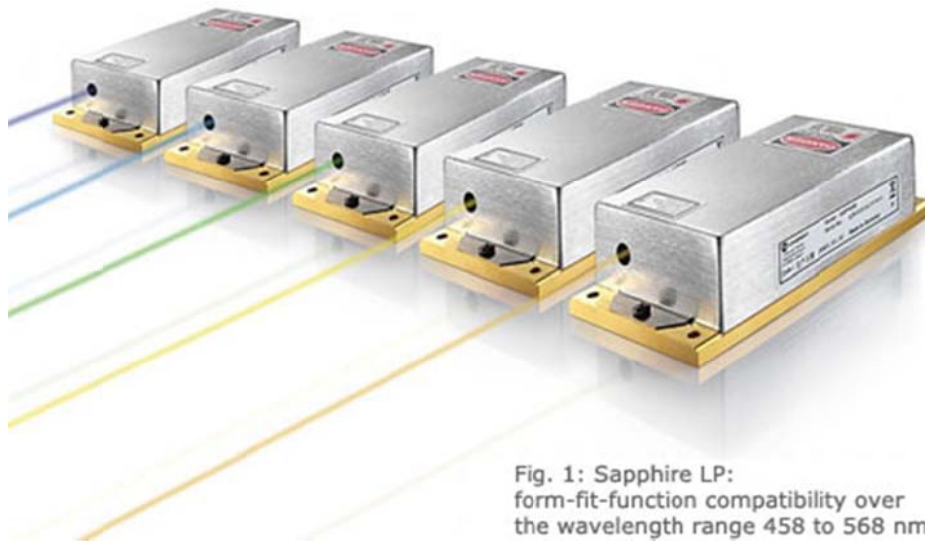


Fig. 1: Sapphire LP:
form-fit-function compatibility over
the wavelength range 458 to 568 nm

Today the Sapphire LP wavelength spectrum has been considerably expanded by legacy Argon, Krypton and Nd:YAG laser as well as customized wavelengths: 458nm, 460nm, 514nm, 532nm, 552nm, 561nm, 568nm, a development that is ongoing. Independent of wavelength and power class: all these products come with the same optical parameters, mechanical and electrical requirements, and the same interfacing/ controlling. The modules are compact: the laser head for example is measuring just 125x70x34 mm (4.9x2.8x1.3 in.). The controller comes with Analog, RS232 and USB interface. It is up to the user to select his communication mode.

Sapphire LP is available in OEM and stand-alone CDRH configurations. The latter comes with the controller and power supply in a wall plug-ready box (see Fig. 2).



Fig. 2: Sapphire LP in OEM (left) and CDRH version: laser head and controller

In the beginning for the wider introduction of Sapphire LP the availability of higher powers was a handicap. To provide 100, 200 and 500mW at 488nm a larger package was needed: Sapphire HP. Its laser head dimensions are 215x140x51mm (8.4x5.5x2.0 in.). Still small compared to ion lasers. But the improvement of optical and semiconductor materials and the subsequent exploitation in optimized resonator designs have led to a continuous increase of laser powers without expanding the geometry of the Sapphire LP package or its maximum power consumption (< 60W for all power classes).

Today, depending on the wavelength, up to 300mW are available out of the Sapphire LP package. Even for the critical deep blue wavelength 458nm 75mW is commercially available.

The road to higher powers was passed without any sacrifice of the superior laser parameters: the laser beam quality stays excellent (e.g. $M^2 < 1.1$, divergence < 1.3mrad, pointing < 5 μ rad), the power stability is high (<2% over 2 hours, $\pm 30^\circ\text{C}$), the noise low (<0.25% rms at 20Hz to 2MHz).

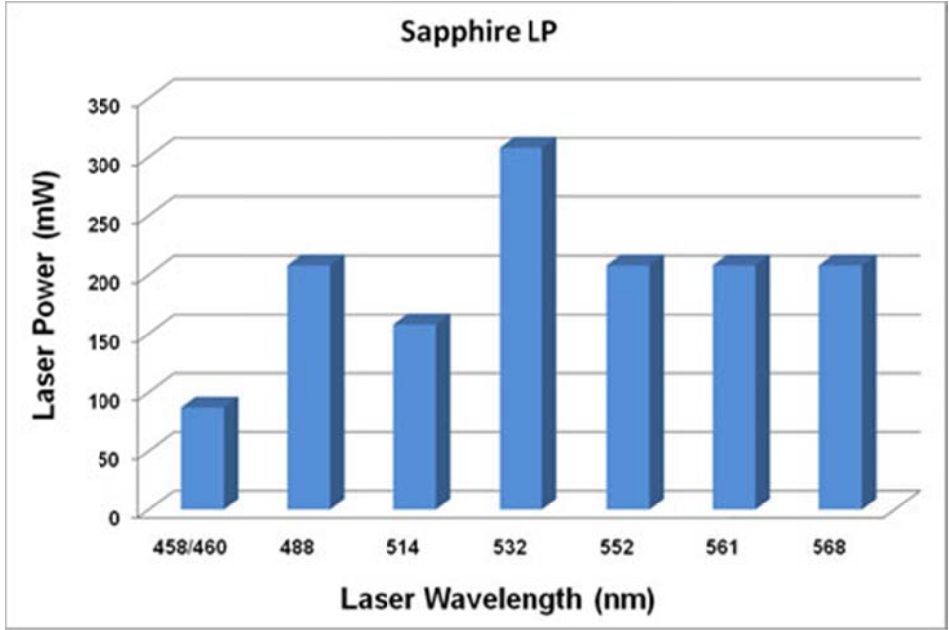


Fig. 3: Sapphire LP's available wavelengths and max. power classes

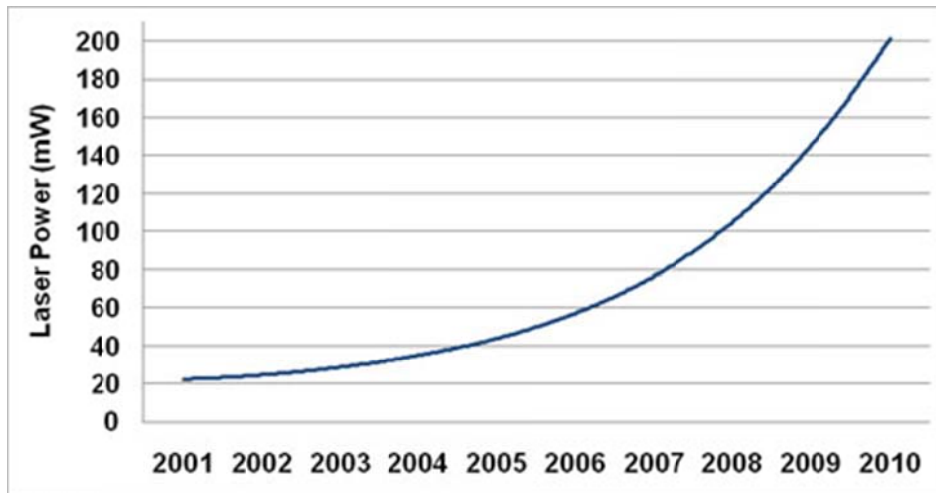


Fig. 4: Sapphire LP 488 power development over the years

Sapphire LPs compatibility of optical, mechanical, electrical and interface parameters, the small size, low power consumption, flexible interface concept, wavelength versatility plus now also high power capability simplifies integration and installation especially for system integrators who have to incorporate multiple lasers of different wavelength.

The Sapphire LP line primarily targets at applications in life sciences such as flow cytometry, cell sorting, wide-field, confocal and super-resolution microscopy, sequencing in genomics and proteomics, medical diagnosis, and semiconductor inspection, metrology, testing. The availability of higher powers supports and enables the development to higher throughput and improved resolution.

[Datasheet Sapphire LP](#)

Please feel free to contact our product manager Andreas Zuck to discuss your application and needs.
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About Coherent, Inc.

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