Press release

Comprehensive know-how and the full value chain, from technology development to complete systems

The FBH presents its advanced diode lasers and UV light-emitting diodes at “Laser World of Photonics“ and the associated conference “CLEO Europe“

Berlin, June 16, 2015

The Ferdinand-Braun-Institut (FBH) exhibits a selection of current improvements and new developments regarding diode lasers and UV light-emitting diodes (LEDs) at the international trade fair „Laser World of Photonics“ in Munich from June 22 - 25, 2015. Based on the in-house available full technology chain, the institute’s tailored diode lasers enable access to a variety of applications. From materials analytics, sensors, and display technology to materials processing – the flexible all-rounders can be perfectly optimized according to specific requirements. Increasingly, the institute refines its developments up to ready-to-use systems, enabling customers to test FBH developments in their individual application. The institute is also represented at the associated conference “CLEO Europe“ with the short course “High Power and High Brightness Semiconductor Laser Diodes and Applications“, several lectures, and posters.

Module for plant lighting with UV-B LEDs

The FBH develops the LED technology in the UV-B and UV-C spectral range from the chip to the final radiation module. Applications are wide-ranging and include medical diagnostics and fluorescence spectroscopy as well as UV curing and disinfection. A further application field is plant lighting, for which the FBH has developed and manufactured a module enabling irradiation with UV-B light of a specific wavelength. In this particular case, LEDs emitting at a wavelength around 310 nm are used to stimulate health-promoting secondary metabolites in plants. The optical power can be flexibly adjusted between 0 and 100%. The novel concept was successfully tested in experiments at the Institute of Vegetable and Ornamental Crops (IGZ). An exhibition module is available at the trade fair booth.

Separating signals – dual-wavelength diode laser for Raman spectroscopy

At the fair, the FBH exhibits novel dual-wavelength diode lasers that are suitable for use in miniaturized, portable laser measurement systems for Raman spectroscopy applications. The laser sources alternatingly emit light from only one chip at two different stabilized wavelengths, which are defined by gratings implemented into the semiconductor chip. Wavelength selection is realized by separately addressable sections within the laser. The innovative diode laser chip is ideally applicable for SERDS (Shifted Excitation Raman Difference Spectroscopy), enabling to measure Raman spectra under real-world conditions even in highly fluorescent environments and when exposed to daylight. Thus, it is possible to separate Raman signals from background interferences. Moreover, SERDS improves the detection limit by one order of magnitude compared to standard Raman spectroscopy. With these FBH tiny monolithic light sources on chip level, a compact SERDS measurement head that is only as small as a laser pointer was realized for the first time. This device is the basis for a unique miniaturized and versatile SERDS spectroscopy system, enabling in-situ measurements in various security and health relevant fields including biology, medicine, food control, and pharmacy. Applications in absorption spectroscopy and for generating terahertz radiation are also conceivable.

Simple systems integration due to optical fiber connection – FaBriDi

Fiber-coupled demonstrators newly developed at FBH for industrial use aim at integrating laser radiation with high spectral brightness into various systems, thus enabling easier usage. Now, efficient and compact laser sources are at hand emitting in the near-infrared on multi-watt level (CW operation) with a narrow-band spectrum and a stigmatic, nearly Gaussian laser beam which is independent of the optical power level. Such sources are highly demanded for the pumping of solid-state lasers and frequency doubling. On a footprint of less than 10 cm^2, the micro module integrates a 1064 nm distributed Bragg reflector (DBR) tapered laser, a micro-optical assembly designed to maintain brightness and mounted with sub-micrometer precision and temperature-stabilizing components. The module is also equipped with a single-mode fiber output with standard FC/APC connector.

Higher brilliance and output powers for diode lasers and bars

The institute develops highly brilliant diode lasers in a great variety of designs and packages, covering the wavelength range from 630 nm to 1180 nm. Single emitters with a stripe width of 90 µm, for example, reach peak brilliance results with 3.5 W/mm-mrad. The same applies to even smaller stripes delivering 4…5 W/mm-mrad from a 30 µm aperture. For rapid prototyping applications the FBH has developed DBR ridge waveguide (RW) lasers with 24 individually addressable emitters featuring a wavelength spacing > 0.3 nm and a spectral width < 1 pm. Further activities at the institute aim at constantly improving efficiency, reliability, and output power. FBH bars around 940 nm at temperatures of -70°C (203 K), for example, delivered a world-wide best result of 2 kW peak power per bar at a pulse width of 200 µs. To date, such powers could only be achieved by combining the optical beams from at least four single bars.

Visit us at “Laser World of Photonics“ in **hall B3, booth 359**. An overview of FBH contributions at CLEO Europe is provided here: http://bit.ly/1KVXC38

Press pictures of all devices described are available. We will provide you with the image(s) most suitable for your purposes promptly, please get in touch. Further images are provided on our website: http://www.fbh-berlin.com/press/download-center. All images are copyrighted.

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