Leibniz Ferdinand Braun Institut

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Fiber-coupled micro-integrated laser sources

The Ferdinand-Braun-Institut has developed miniaturized high-coherent laser sources with free space or fiber-coupled output, covering wavelengths from 460 - 1180 nm (CW to MHz modulation with µs rise times). Based on a single package, each solution is designed to ideally serve the specific application – also available as turnkey option:

High output power & high beam quality

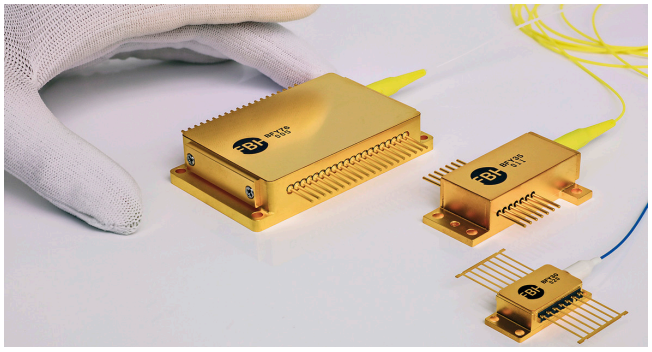
These modules provide a single-mode fiber output and are developed for high-power applications calling for an almost diffraction-limited spatial beam quality. They reach output powers >2 W and provide spectral narrow-band emission from the GHz down to the MHz range. An in-house developed mounting scheme ensures stable fiber coupling at high optical powers.

Narrow spectral linewidth & high polarization extinction ratio

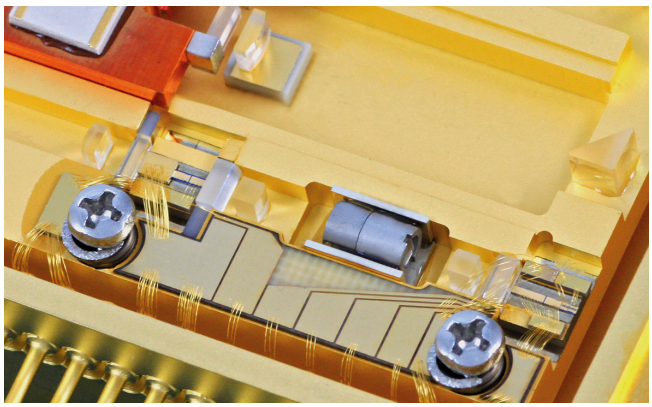
This class of modules has a polarization-maintaining single-mode fiber output. It provides an output power of >200 mW at 1120 nm or >5 mW at 633 nm and is characterized by a polarization extinction ratio >20 dB. A micro-optical isolator is integrated, thus ensuring effective shielding from back reflections and a narrow spectral linewidth <10 MHz. Additionally, gas cells can be integrated for absolute frequency reference. Therefore, the module is well-suited for applications like spectroscopy and interferometry.

Frequency-doubled visible laser light modules

Since no brilliant direct emitting lasers are available in the wavelength range from 532 nm to 590 nm, the FBH uses its high-power, high-coherent NIR laser sources to generate visible light via single pass second harmonic generation. They deliver >1 W output power.



Different laser modules with polarization-maintaining fiber output



Master oscillator power amplifier module with SHG crystal

This preserves the modulation capabilities of the diode laser sources, enabling yellow-green light pulses as short as 100 ps at repetition rates up to 80 MHz. FBH demonstrated up to 2 mW at 560 nm time averaged, coming from a polarization-maintaining single-mode fiber, which is very well suited for time resolved photoluminescence in biology and medicine.

Profile

The Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik (FBH) researches electronic and optical components, modules and systems based on compound semiconductors. In the field of III-V electronics, it manufactures high-frequency devices and circuits for communications, power electronics, and sensor technology. Moreover, FBH develops light sources from the visible to the UV spectral range: high-power diode lasers, UV light sources, and hybrid laser systems. Applications range from medical technology, materials processing and sensors to optical communications in space and integrated quantum technology. In close cooperation with industry, its research results lead to cutting-edge products.

The institute is a member of the Leibniz Association and part of Research Fab Microelectronics Germany (FMD).