

High-power diode lasers for advanced applications, from bars to fiber-coupled pump modules

High-performance broad area diode lasers are available with a wide range of wavelengths, leveraging optimized device design and technology. These diode lasers are required for direct use or as pump sources for advanced solid-state and fiber laser systems. They are delivered as single emitters or diode laser bars for assembly at the customer. Alternatively, they are integrated into novel stacks or high-power fibered modules ready for use.

Device technology options

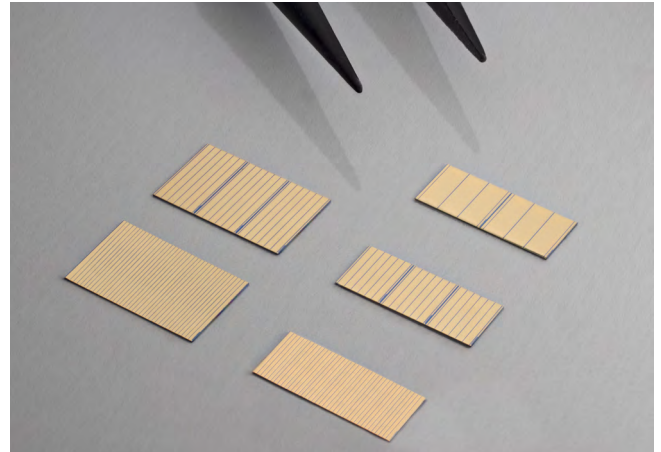
- wavelengths from $\lambda = 630$ to 1200 nm
- single bars with high efficiency (> 60%) to kW-class powers from $\lambda = 900\text{...}1000$ nm
- bars with extremely low vertical divergence for low-loss external optical stabilization
- devices with monolithically integrated gratings for pumping of narrow absorption lines
- brilliant, wide-aperture single emitters with > 120 W from a 1.2 mm aperture

Packaging options for bars and single emitters

- on submount
- in low-resistance “sandwich” carriers
- assembled into passively-side-cooled stacks
- integrated into fiber-coupled modules

Applications

- direct use
- increased performance in pumping of established laser media (e.g. Nd:YAG, Yb:YAG, Th:YAG, YLF)
- pumping of novel laser media (e.g. alkali gas lasers, Yb:CaF₂, Cr:LiSAF and alexandrite lasers)



► Kilowatt-class diode laser bars, customized for application

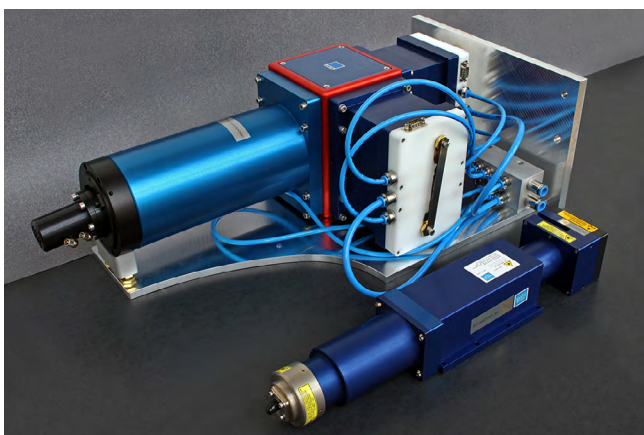
Example performance

- CW 1-kW-class 9xx nm bars: 15°C, actively cooled
- QCW 2-kW-class 9xx nm bars: peak power at -70°C, passively cooled
- QCW 300-W-class 670 nm bars: peak power at 25°C, passively cooled
- QCW 6-kW-class 9xx nm fiber-coupled module: 1.9 mm core NA 0.22, 20% duty cycle

Profile

Ferdinand-Braun-Institut, Leibniz-Institut fuer Hoechstfrequenztechnik (FBH) researches electronic and optical components, modules and systems based on compound semiconductors. These devices are key enablers that address the needs of today's society in fields like communications, energy, health, and mobility. Specifically, FBH develops light sources from the visible to the ultra-violet spectral range: high-power diode lasers with excellent beam quality, UV light sources, and hybrid laser systems. Applications range from medical technology, high-precision metrology and sensors to optical communications in space. In close cooperation with industry, its research results lead to cutting-edge products.

The institute has a staff of 290 employees and is part of the Forschungsverbund Berlin e.V. It is a member of the Leibniz Association and plays an active role in various networks.



► Fiber-coupled pump modules realized in cooperation with industry