Leibniz Ferdinand Braun Institut

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Compact turnkey system for Raman measurements & SERDS

Shifted excitation Raman difference spectroscopy (SERDS) is a powerful and easy-to-use tool to extract Raman signals efficiently and rapidly from disturbing backgrounds such as fluorescence and daylight. Based on its excellent wavelength-stabilized diode laser sources, the FBH has developed a compact and robust turnkey system.

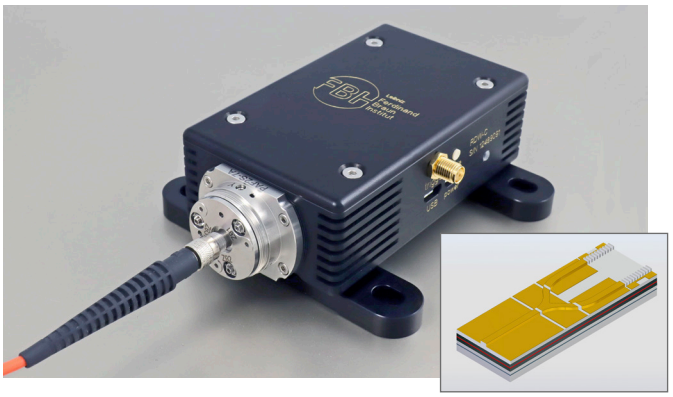
A Y-branch dual-wavelength distributed Bragg reflector (DBR) diode laser is used as the core element. Micro-heaters implemented above the two DBR gratings provide wavelength tuning over several nanometers and thus a flexible spectral distance for SERDS – simply by changing the heater current. The sources offer fast alternating operation between both laser lines, consequently enabling investigations with reduced exposure times down to the millisecond range. The turnkey system is designed to be connected to optical cage systems. Therefore, it can be easily integrated into laboratory set-ups or portable measurement systems.

General specifications

- dimensions: 100 x 60 x 40 mm^3 (L x W x D)
- PC interface: USB, offline mode for autonomous operation without PC
- input. 5 V (DC), 2.5 A
- operating temperature: 15 °C ... 40 °C
- max. power consumption: 12.5 W
- GUI for control and monitoring
- trigger input/output: internal via software, external via SMA connector
- flexible mounting to an inch or metric optical table
- easy integration via 30 mm optical cage system

Light source specifications

- available emission wavelengths: 671 nm, 785 nm; other emission wavelengths 630 nm ... 1080 nm upon request
- spectral width: < 10 pm (< 0.2 cm^{-1})
- flexible spectral distance: 0 cm^{-1} ... 30 cm^{-1}
- optical power: 100 mW, 200 mW available upon request
- CW operation, alternating operation between both laser lines with a frequency up to 1 kHz (50% duty-cycle), higher frequencies upon request



Turnkey system for dual-wavelength diode laser; scheme of a Y-branch DBR diode laser (inset).

Applications

- Raman spectroscopy
- SERDS

Advantages

- separation of Raman signals and background signals via SERDS as a physical approach
- simplified connection for laboratory and on-site experiments

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).