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VERTIGO - Versatile two micron light source

EU-project VERTIGO has extended the wavelength coverage of semiconductor disk lasers to the 1.9 – 2.8 μm regime.

The European project VERTIGO develops novel photonic components: long-wavelength optically pumped semiconductor disk lasers (OPSDL). In demonstrating the first OPSDL at 2.8 μm operating at room-temperature in continuous wave (CW-) mode, we considerably expanded the wavelength range of this class of semiconductor laser (see Fig. 1). This wavelength flexibility, unknown to classical solid-state lasers, together with the flexibility of the OPSDL concept itself leads to a multitude of customized laser solutions, all based on the basic OPSDL gain chip (see Fig. 2):

- **Center emission wavelength:** any wavelength between 1.9 and 2.8 μm can be targeted with our new OPSDL technology in order to fully optimize the laser wavelength to the application needs. A further wavelength expansion to 3 μm and above is envisaged.
- **Wavelength tunability:** every OPSDL chip can be tuned by about 100 – 150 nm around its center emission wavelength.
- **Power and efficiency:** Output powers up to 3 W at 2 μm are achieved at room-temperature in CW-mode, with an optical quantum efficiency of 45 %. At the long-wavelength end (2.8 μm) over 120mW were achieved and 500mW in pulsed operation. Further power scaling can be achieved using multiple-chips in one cavity.
- **Beam quality:** The beam quality parameter M^2 is in the range of 1-3, depending on the resonator setup.
- **Single frequency operation:** By a simple optical filter, the OPSDL can emit on a single resonator mode with a linewidth below 2.3 MHz (see project news #3)

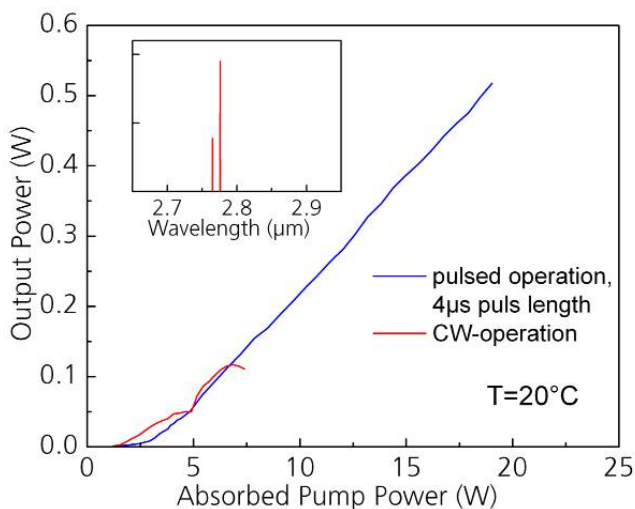


Fig. 1: Output power characteristics of the first OPSDL emitting at 2.8 μm in CW- and pulsed operation at 20°C. The inset shows the emission spectrum in pulsed mode



Fig. 2: OPSDL semiconductor structure with transparent heatspreader, mounted inside a submount. This mounted chip is the core for all different laser resonators.

For further information please do not hesitate to contact us:

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