Leibniz Ferdinand Braun Institut

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Blue-violet emitting GaN diode lasers systems

The Ferdinand-Braun-Institut develops AlGaInN-based ridge waveguide diode lasers (RWLs) emitting in the wavelength range from 390 nm to 430 nm. We analyze and continuously optimize our processes, from substrate quality to epitaxy and chip process technology to assembly technology targeting increased yield and reliability of our RWLs. As the complete process chain is available in-house, we can offer customized solutions regarding wavelength, beam quality, and output power.

Complete in-house process chain

- simulation of device performance
- epitaxial growth of (InAlGa)N heterostructures incl. material analysis
- chip process and facet coating technology
- chip assembly on submounts and heat sinks
- electro-optical characterization
- long-term stress tests

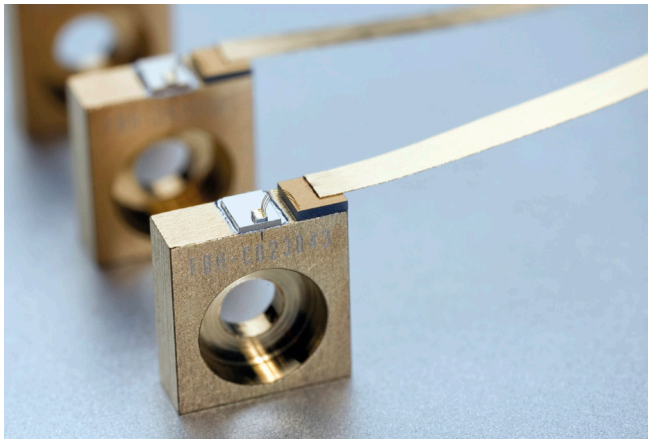
Device technologies explored

- single and multi-lateral mode RWLs
- facet coatings: from anti-reflection to mirror-like
- chip packaging: C-mount and sealed TO-cans
- small linewidth laser sources (DFB, DBR and ECDL)

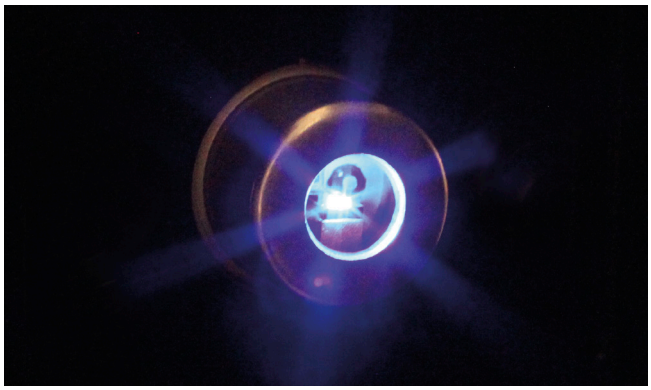
Examplary device performance

2 µm x 600 µm RWL emitting at 420 nm:

- threshold of about 60 mA and 5.5 V
- fast axis far field angle FWHM ≈ 26 °
- lifetime at 20 mW in continuous wave operation > 500 h (up to 10.000 h)



GaN diode laser mounted p-up on submount and C-mount.



GaN diode laser mounted p-up in TO package.

Applications

- atomic spectroscopy
- atomic clocks in space
- metrology
- medical technology
- communication

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).