

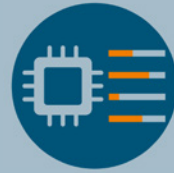
R&D services along the III-V semiconductor value chain

Together with national and international partners from science and industry, Fraunhofer IAF plays a leading role in the research and development of customized III-V semiconductor devices for various applications. Thanks to the expertise of its researchers, its large network, and its unique research infrastructure, the institute covers the entire value chain: from design, epitaxy, processing, characterization, and module development up to system applications.

In addition, Fraunhofer IAF has decades of experience in running complex international research projects and collaborations with customers from industry and small and medium-sized enterprises. This enables an equally efficient and flexible cooperation in the application-oriented research and development of innovative technologies as well as in the customized implementation of orders.

Would you like to learn more about our R&D services along the III-V semiconductor value chain? We will be happy to present our work and various cooperation opportunities to you in person.

Simulation and design



Epitaxy



Process technology



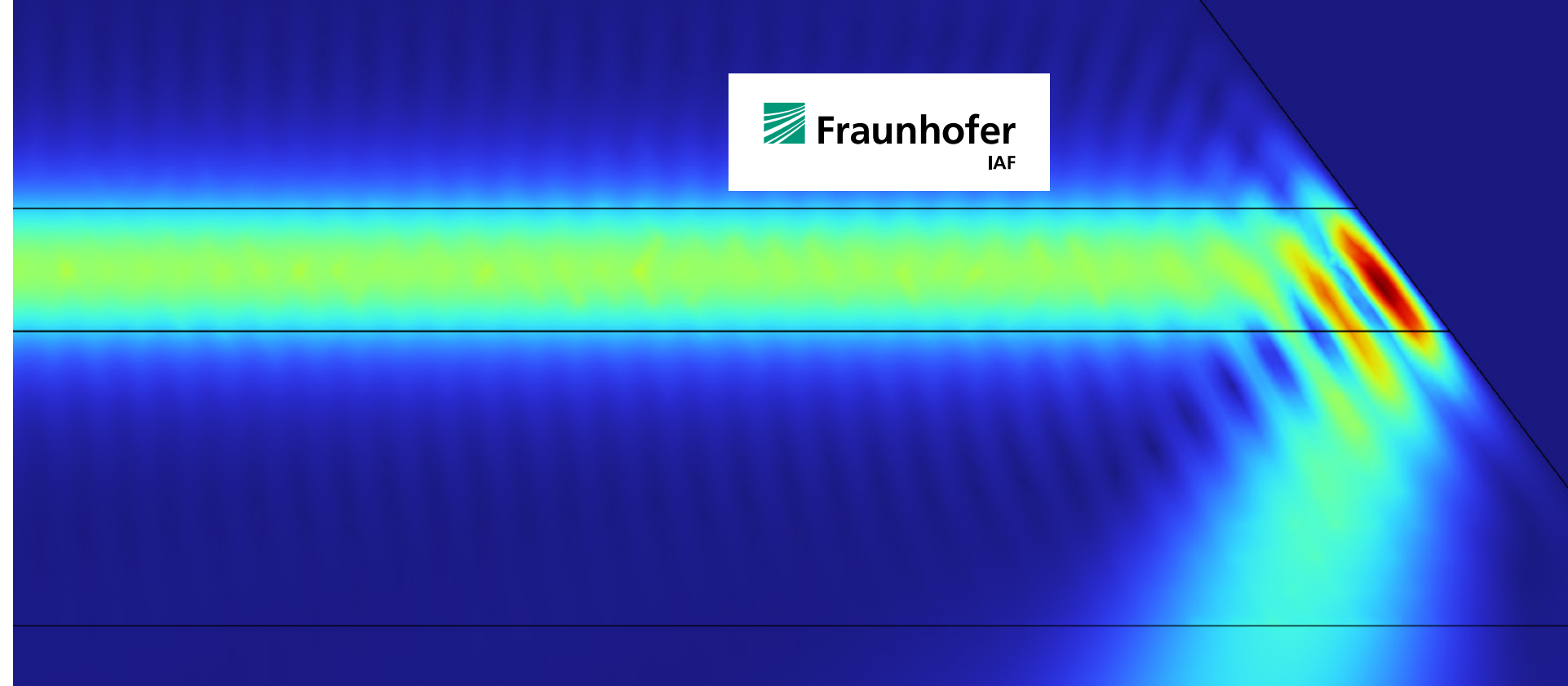
Characterization



Components



Modules



Contact



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Simulation and design

Electronic and optoelectronic devices and modules

Simulation and design of electronic and optoelectronic devices and modules

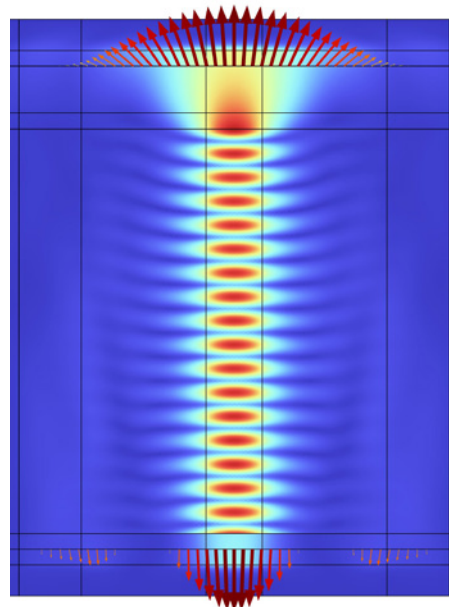
We simulate and design MMICs, laser heterostructures, devices, and modules before growth, processing or assembly.

At Fraunhofer IAF, we support industry in the development of novel III-V electronic and optoelectronic devices — both in manufacturing and in design and simulation.

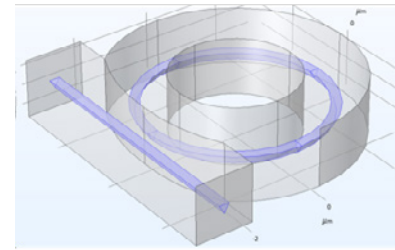
Our foundry service for III-V devices includes, e.g., MMIC design for high-frequency circuits and filters for GaN devices as well as heterostructure design for optically pumped semiconductor disk lasers and quantum cascade lasers.

In addition, we design and simulate modules and systems, including customized electronics and special optical coatings.

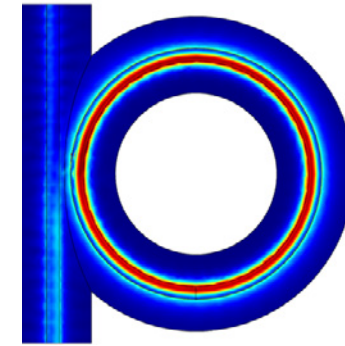
The individual development and realization of devices together with partners and customers from industry and science is part of our everyday work. We gladly deal with your idea and design suitable solutions for your customized application.



Simulation of electric field distribution in a cavity with coated facets



Waveguide simulation of a triangular shaped diamond ring resonator



Examples of our simulation and design capacities

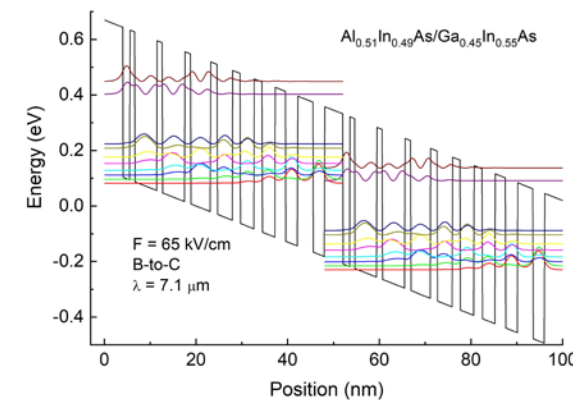
- Transistors and integrated circuits (ICs)
 - Metamorphic HEMT and GaN HEMT
 - Access is supported by process design kits (PDKs) in the Keysight design environment ADS
- VECSEL heterostructures 1.9–2.7 μm
- QCL heterostructures 4–12 μm
- Optical coatings
- Waveguides

Thermal simulations

- CAD design of modules and systems

Tools (selection)

- ADS
- COMSOL
- Optilayer
- SolidWorks
- AFM, REM, FIB, EDX



Quantum cascade laser band structure calculation



GaN MMIC for power electronics applications



Good simulations and designs are the first step and an essential prerequisite for devices to deliver on their performance promise. «

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