

FOCUSLIGHT

Never stop exploring

Focuslight Overview

- Founded in 2007 by Dr. Victor X. Liu, headquartered in Xi'an, China.
- A fast-growing company that develops and manufactures **high-power diode laser components and materials** (photon generation) and **laser optics** (photon control) used in various industries and applications.
- Business scope is being extended by developing and manufacturing **photonic application modules, assemblies, and sub-systems** (photonics application solutions) with a focus on automotive, pan-semiconductor, and medical & health application solutions.
- Public listed company in the Shanghai Stock Exchange (Ticker Symbol: 688167).



Milestones

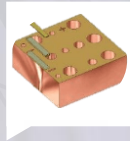
Products

CS series released – Our very first laser



2008

Full-scale application of indium-free bonding



2010

GS series released – Ultra-light conduction-cooled diode laser: QCW 3kW = 2g



2012

Vshiny, the world's most shipped hard-solder packaged microchannel laser hair removal engine, launched



2014

UV-L750 Ultraviolet Line Laser System won Prism Award



2018

Automotive LiDAR transmitter project awarded from international Tier 1



2019

Production of micro-optics on world's largest glass wafer (300 x 300 mm²)



2020

Fast Axis Collimator (FAC) monthly shipment exceeded 1M pcs.



2021

Laser system for wafer annealing in semiconductor manufacturing processes launched



2023

Line Beam LiDAR Transmitter Module awarded nomination from European Tier 1



2024

Technology and Development

Founding of Focuslight



2007



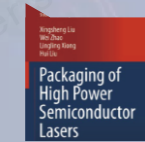
ISO9001 certified

Focuslight Public Information 2

Entered professional medical and health market



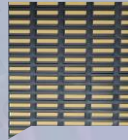
2009



World's first monograph on packaging of HPDL published

Focuslight Public Information 2

Technology breakthrough of gold-tin film preparation



2012



Acquisition of LIMO Started providing photon control and photonics application solutions

Focuslight Public Information 2

Establishment of Automotive BU Entered LiDAR market



2013



Dongguan delivery and high-volume manufacturing center officially in operation

Focuslight Public Information 2

Xi'an HQ IATF16949 certified



2017



Exclusive cooperation with world-famous device manufacturer Entered consumer medical and health market

Focuslight Public Information 2

Successful IPO at SSE Star Market



2018



Breakthrough using solid-state line laser in annealing process of FPDs

Focuslight Public Information 2

Invested in new facility in Shaoguan focused on medial and health application solutions



2019



Brand unified globally

Focuslight Public Information 2

Dongguan Base IATF16949 certified



2020



Invested in new facility in Hefei focused on pan-semiconductor application solutions

Focuslight Public Information 2

Acquisition of SUSS MicroOptics



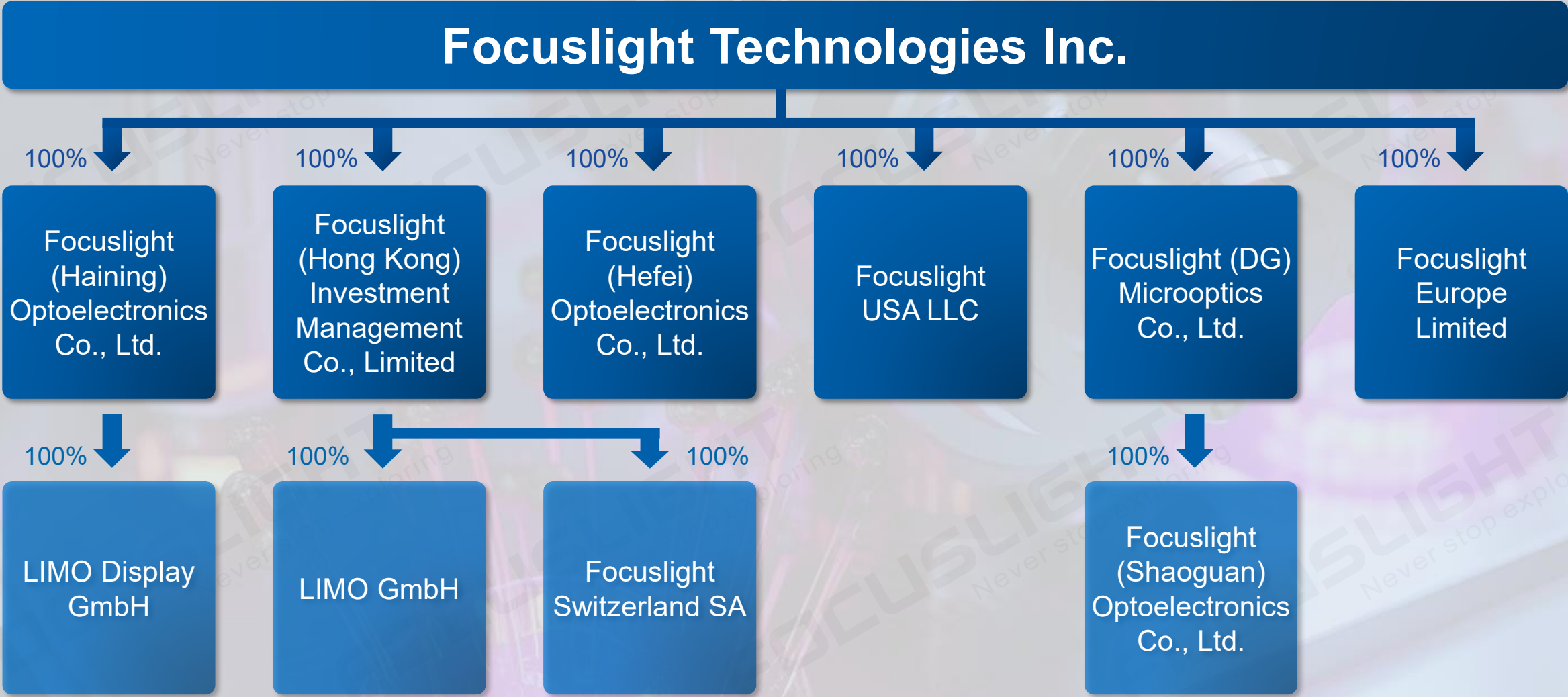
2021



Acquisition of SUSS MicroOptics

Focuslight Public Information 2

Focuslight Corporate and Subsidiaries



Key Facts & Figures



Employees
>900



Yearly Revenue Proportion
Invested into R&D
~16%



Patents Valid
Worldwide
>430



Facility Building
Worldwide
>43,000m²



Clean Room
Worldwide
>11,000m²



ISO 9001
ISO 14001
ISO 45001
IATF 16949
Certified

Corporate Management Team



Dr. Xingsheng Liu (Victor)

Chairman,
CEO

- Research and management experience in America (Virginia Tech, Corning, Coherent, nLight)
- 100+ publications, 300+ patents, 30+ invited papers internationally
- Committee Member of SPIE and IEEE, served or serving as chair or committee member of international conferences

CORNING



COHERENT

nLIGHT



Dr. Chung-En Zah

CTO

- 30+ years of research experience in America (Corning, Bellcore)
- 300+ publications, 50+ patents in optoelectronics and telecommunication
- IEEE Fellow, OSA Fellow, 2x R&D 100 award winner

THORLABS

CORNING

Bellcore
© Bell Communications Research



Mr. Guowei Zhu (Gavin)

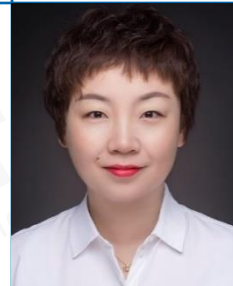
Corporate VP of Quality,
President of Automotive BU,
Director of Corporate R&D

- Over 20 years experience in international automotive companies
- Rich plant P&L and operations management experience
- Familiar with IATF quality management system, KPI management, team building and plant operations management by World Class Manufacturing (WCM) & Lean manufacturing

MAGNETI
MARELLI



BorgWarner



Ms. Yiping Ye (Alison)

Board Director,
CFO

- Over 15 years management experience and multi-field business practices, familiar with LTC, IPD and intercultural cooperation
- In-depth understanding and rich operational experience in market development, project operation and business management



HUAWEI

Hanergy
汉能

Corporate Management Team



Mr. Ye Tian

Board Director,
Corporate VP of Global Sales,
China Sales Director

- Over 15 years' experience in market development, product marketing and sales
- Received the certificate of CEIBS' Leadership Acceleration Program

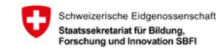
PHILIPS Lighting



Dr. Reinhard Voelkel

Chief Strategy Officer

- MSc in Physics and PhD in Natural Sciences, both at the University of Erlangen-Nürnberg
- +35 years of professional experience in the field of micro-optics, with expertise in strategic leadership, business development, and innovation



Dr. Patrick Heissler

Chief Commercial Officer

- Master in Physics at LMU, PhD in Physics at Max Planck Institute of Quantum Optics and MBA in Innovation and Business Creation at TUM
- +11 years of professional experience in micro optics, with a focus on research, business development and technical leadership



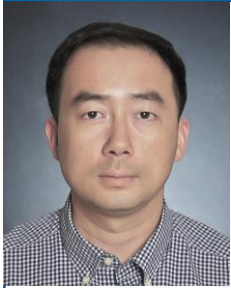
Ms. Xuefeng Zhang (Jennifer)

Board Secretary,
Marketing Director

- 13 years photonics industry international business experience
- In-depth understanding and rich experience in sales, marketing and business development.



Corporate Management Team



Mr. Jinchao Qu

President of Diode Laser BU,
President of Medical & Health BU

- Extensive years of product marketing and sales management experience
- Outstanding track record in previous roles as Asia Sales Director and Head of the Application Systems Special Task Force

ALSTOM SIEMENS



Mr. Dirk Walter Bogs

President of Laser Optics BU

- Over 25 years' experience in ultra-precision tooling, optic manufacturing, engineering & project management
- More than 20 years' experience in operational management
- Very deep knowledge of technology development and optimization
- Experienced and familiar in international cooperation

LIMO
A Focuslight Company



Mr. Yong Tian (York)

VP of Laser Optics BU

- 20+ years of operation & R&D management
- Very deep knowledge with organic optical materials and optical coating technology, published SCI articles and owns patented technologies
- Experienced in Lean Manufacturing & Industry 4.0

IBM ZEISS



Mr. Yong Li (Leon)

VP of Automotive BU,
VP of Business and Strategy of Laser Optics BU

- Outstanding leadership in previous roles: Overseas Sales Manager, Product Line Manager, and Head of the Automotive LiDAR Strategic Project
- Led the team to the successful automotive-grade SOP of the world's first all-solid-state LiDAR transmitter module
- Winner of Laser Focus World 2021 Rising Stars Award
- Experienced in international cooperation and strategic planning

Sumavision HUAWEI



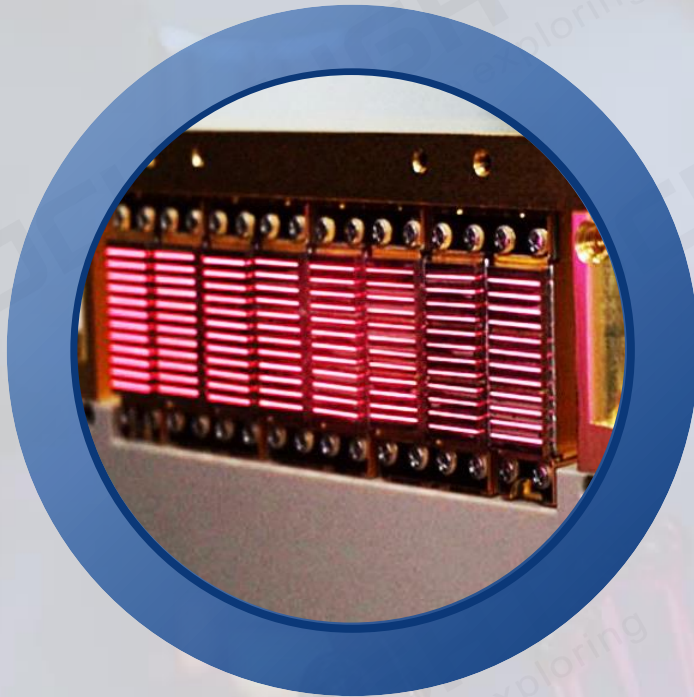
Mr. Ye Dai (Robert)

President of Pan-Semiconductor Solutions BU

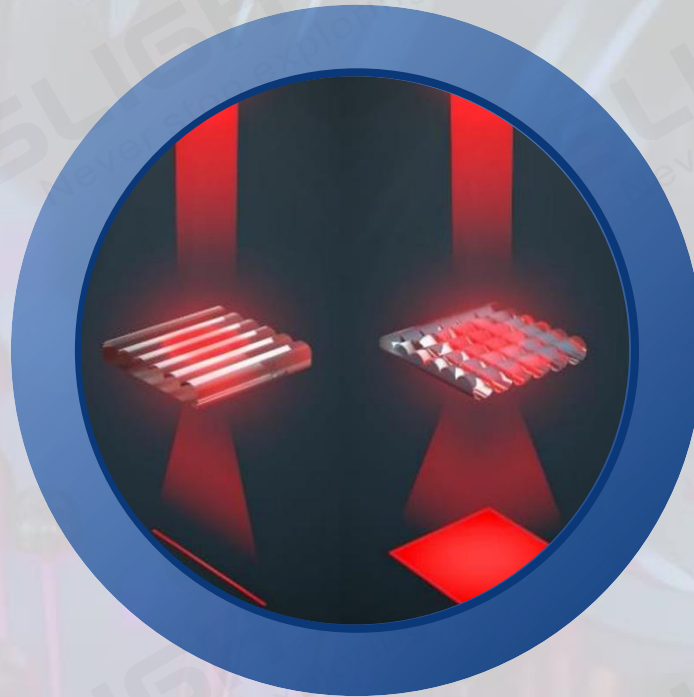
- Excellent track record in worldwide sales & product line management leadership roles
- 20+ patents granted

IVO APPLIED MATERIALS

Products and Businesses



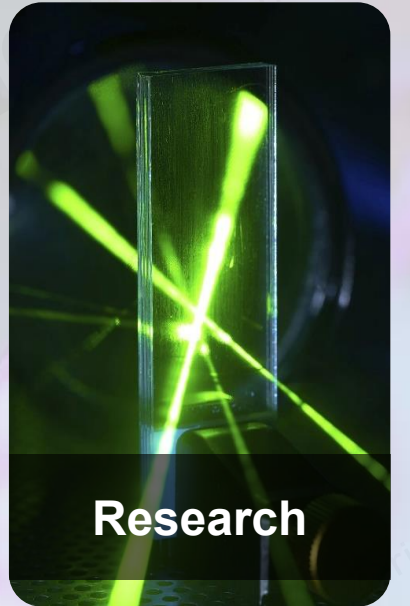
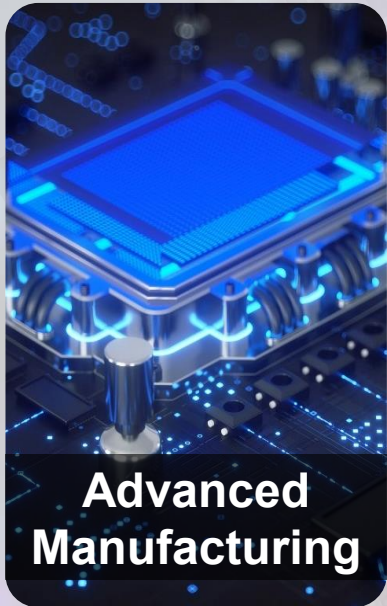
**Photon
Generation**



**Photon
Control**

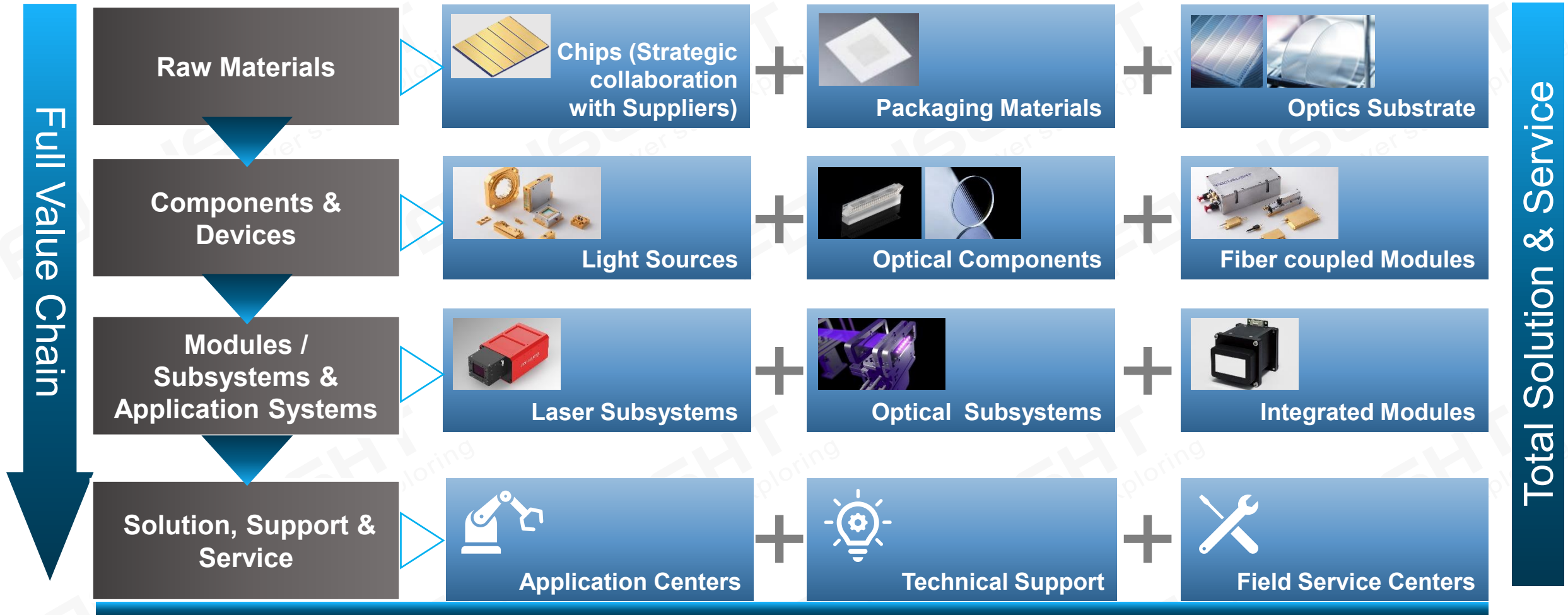


**Photonics
Application
Solutions**



**Be the global trusted photonics solution provider
through innovation, manufacturing excellence and fast response**

Value Proposition



Industry Leader
Strong Financial Backing
Healthy Stable Company, Invest in the Future

Value Proposition



- ◆ **Quality First** philosophy



- ◆ Strong **IP position**



- ◆ Customer **commitment** and willing to **invest**



- ◆ Advanced **technical strengths** and **“know-how”**



- ◆ Extensive **engineering** capability and high-volume **manufacturing**



- ◆ **Low-cost production** ensured by high yield, low RMA & high productivity



- ◆ Comprehensive **quality assurance system including IATF 16949 Automotive QMS standards**



- ◆ **Full range of product portfolio** from components to modules or subassembly



- ◆ Application support and **total solutions**



- ◆ Versatile **customization service**

Vision

FOCUSLIGHT
Never stop exploring

**To unlock the potential
of photonics to enhance
and enrich people's life**



Company Organization

**Focuslight
Technologies**

Diode Laser BU

Laser Optics BU

Automotive BU

Pan-Semiconductor Solutions BU

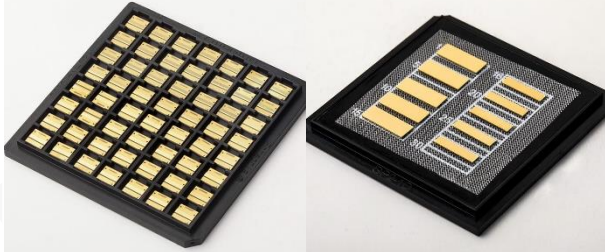
Medical & Health BU

**Unified Corporate Function +
Shared Service Center**

* BU: Business Unit

Products – Diode Laser Components and Materials

Advanced Materials



- AuSn Pre-Deposited AlN Ceramic Substrates
- AuSn Pre-Deposited CuW Substrates
- Thin Film Metallization Service

Active Devices



- Single Emitter Components
- Single Bar Components
- Micro-Channel Cooled Stacks
- Conduction Cooled Stacks
- Pumped Modules

Fiber Coupled Modules & Passive Components



- Emitter-Based FCM
- Bar-Based FCM
- Patch Cords

Professional Medical Application Components



- Laser Hair Removal Modules
- Medical Lasers

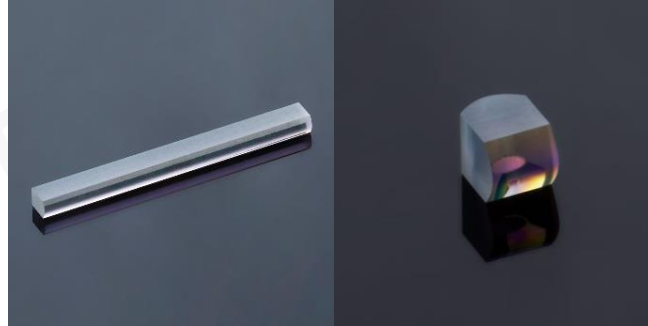
- Focuslight offers our customers a variety of products.
- Focuslight is committed to providing our customers with reliable, high-performance laser products and superior services

Products – Laser Optics Components

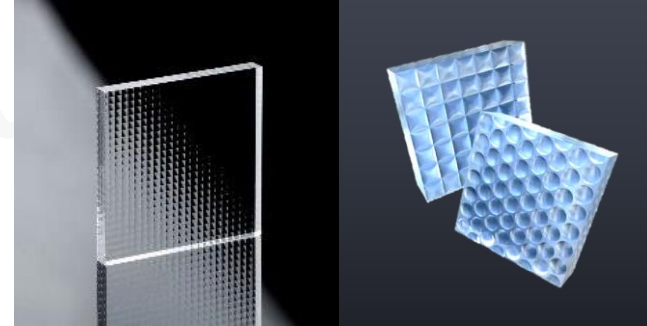
**Single (A)spherical Lenses
and Arrays (SAL)**



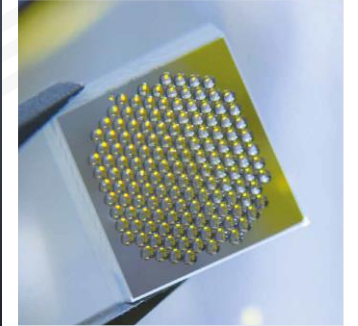
**Single (A)cylindrical Lenses
(SCL)**



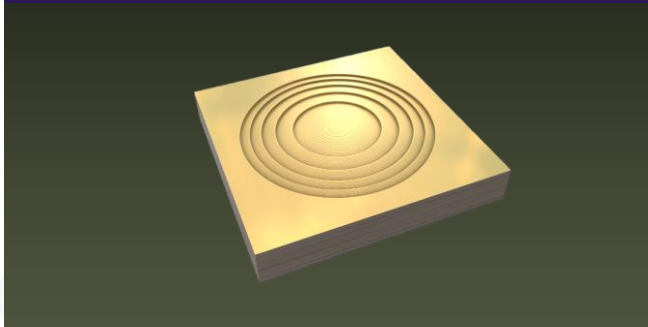
Micro Lens Arrays (MLA)



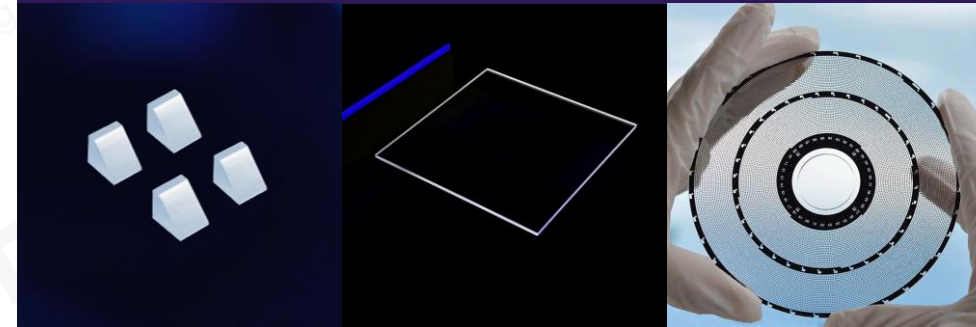
Polymer-on-Glass (PoG)



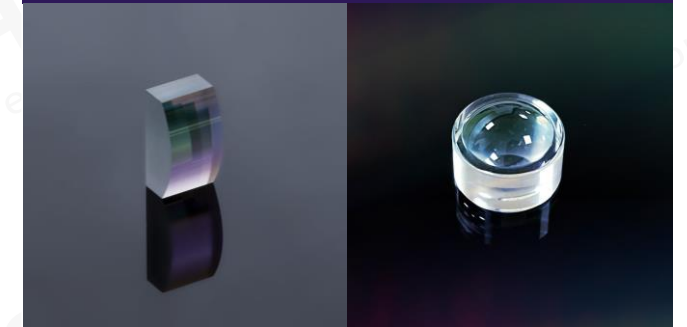
**Diffractive Optical Elements
(DOE)**



**High-Damage-Threshold Coating
and Optics (HCO)**



**Precision Molded Optics
(PMO)**



Products – Automotive Application Solutions

Flash LiDAR Transmitter Modules

AL01 (Mass Production)



Auto-grade DPSSL Flash Tx

AT02 / AT02 Pro
(Engineering Sample)



Auto-grade VCSEL module for DMS (Driver Monitoring System)

AX02 Pro (Engineering Sample)



VCSEL Flash Tx 700W

LE02 Pro
(Engineering Sample)



905nm 700W EEL Line Beam Tx

LX02 (Engineering Sample)



VCSEL Line Tx 1000W

Optical Components and Assemblies for Automotive

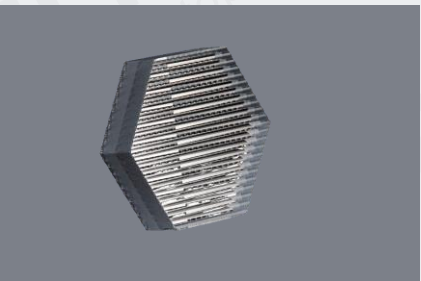
EEL FAC Collimators



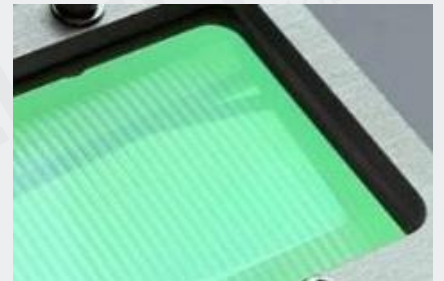
Auto-grade Diffusers and Homogenizers



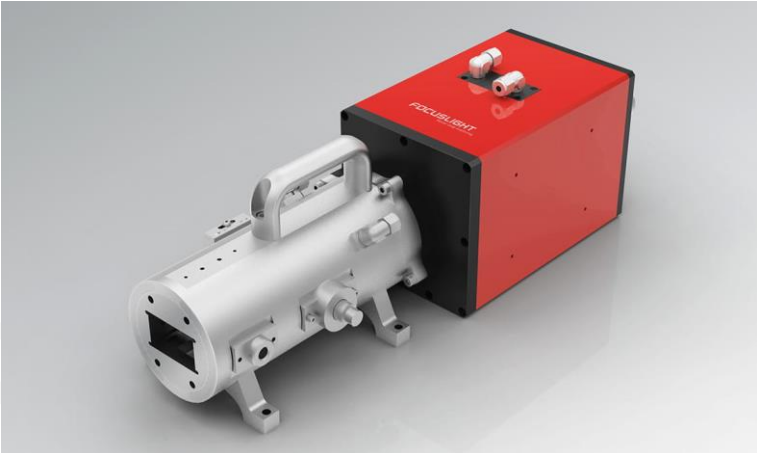
Optics for Automotive Projection and Lighting



Customized Optical Assemblies



Products – Pan-Semiconductor Application Solutions



IC Wafer Annealing System



Variable Beam Laser System



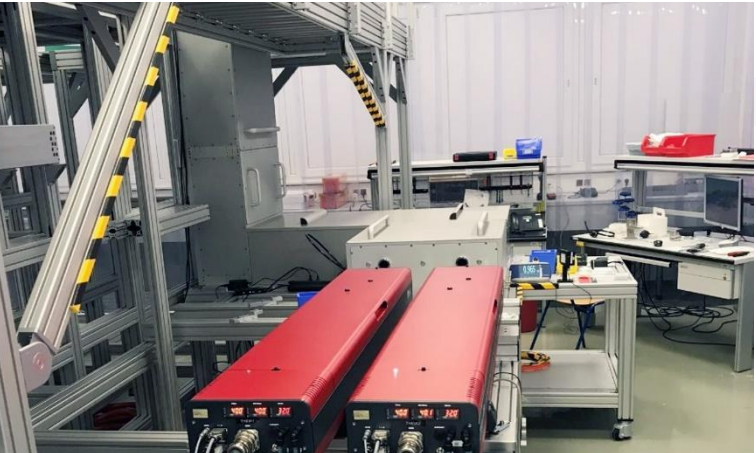
Solid-State Laser Lift-Off (LLO) System



IR Line System



Industrial Laser Modules



Solid-State Laser Annealing (SLA) System

Products – Medical and Health Application Solutions

Professional Medical & Health Modules

Laser Hair Removal Module



Laser Body Sculpting Module

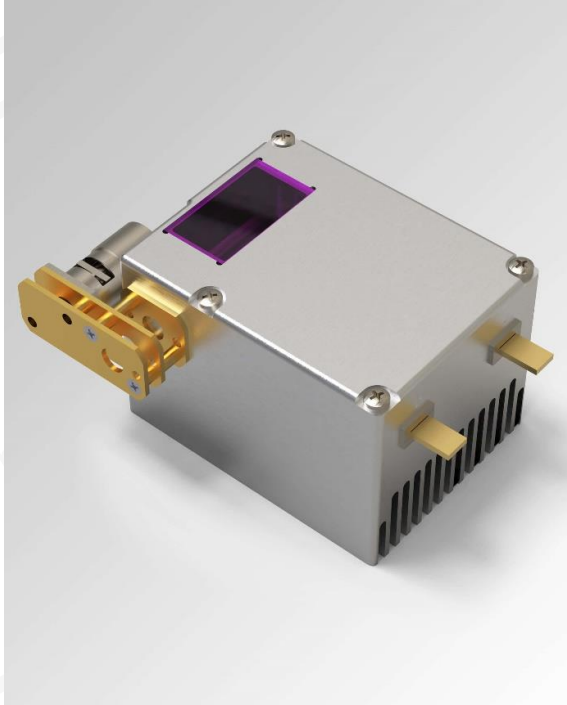


Consumer Medical and Health Modules

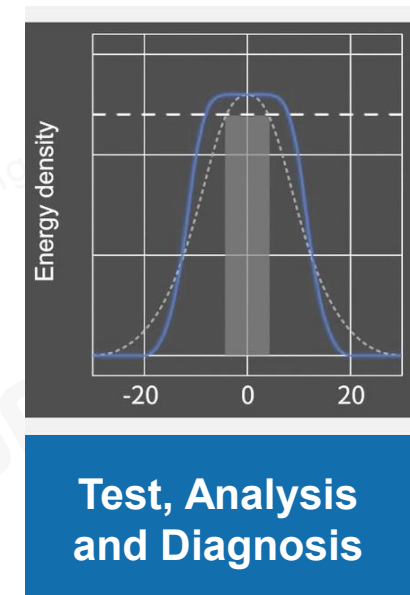
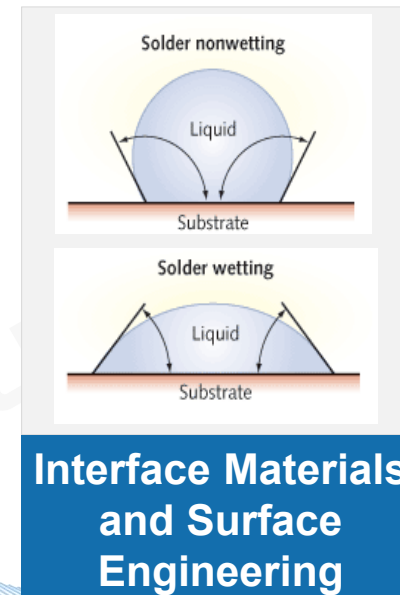
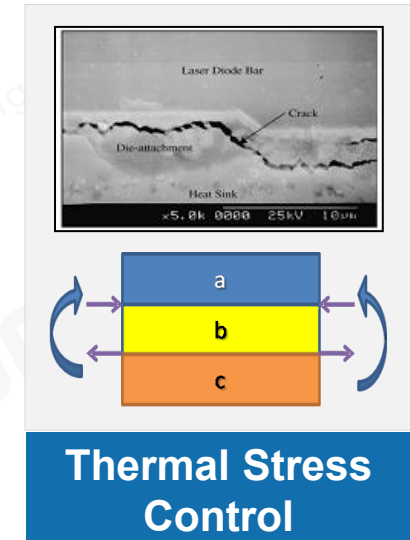
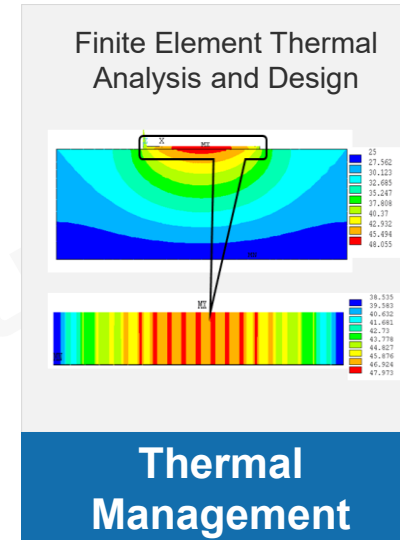
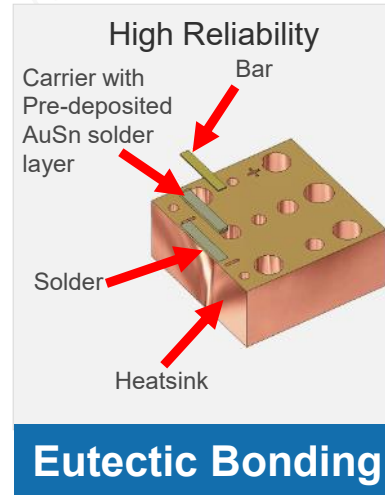
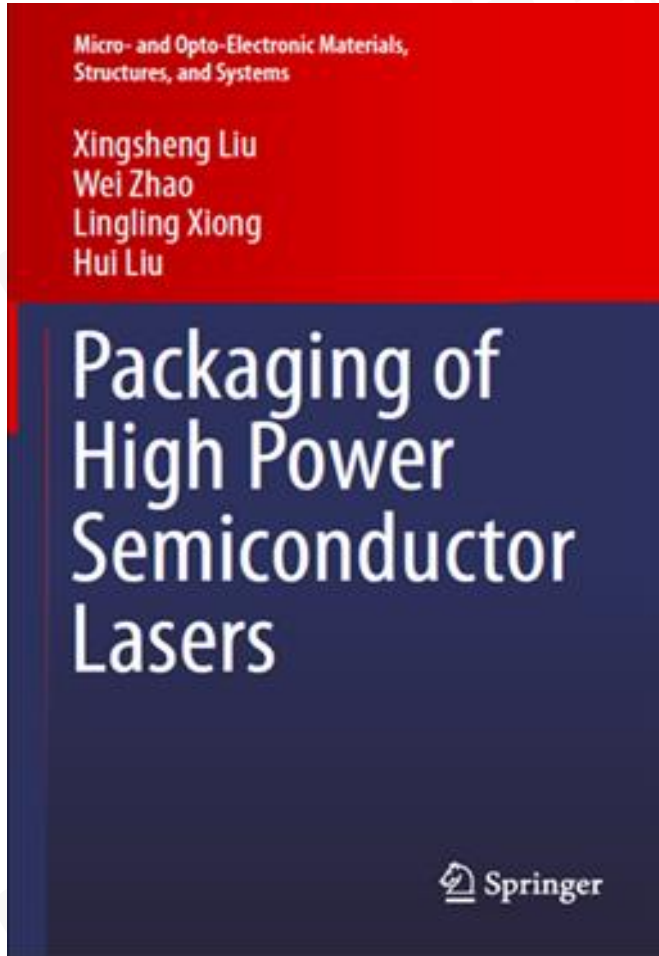
Home-use Skin Rejuvenation Module



Home-use Laser Hair Removal Module



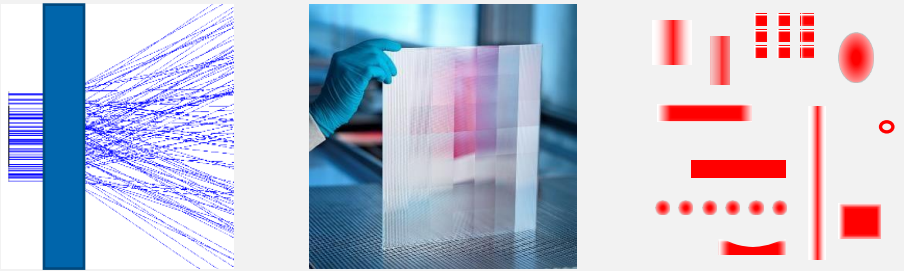
Core Competence – Diode Laser



Core Competence – Beam Shaping

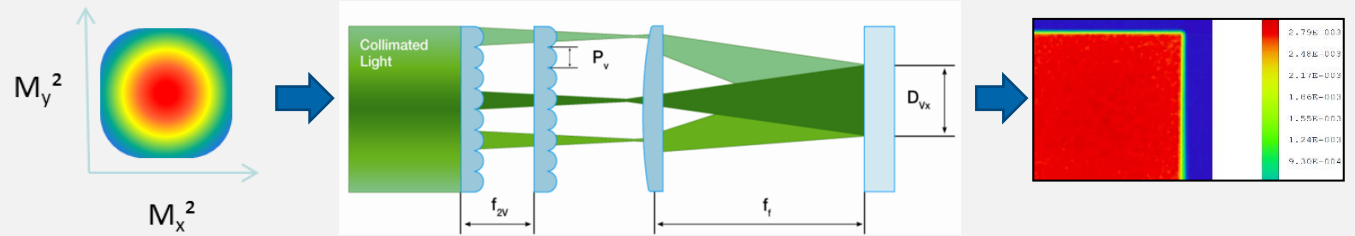
Micro Optics Design and Simulation

Acylindrical free-form micro-optics / arrays / diffusers / DOE splitters / beam shaping systems



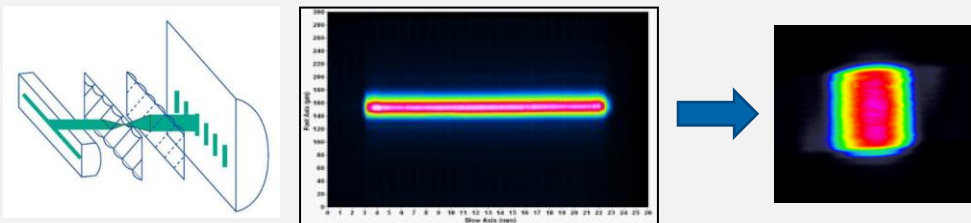
Homogenization

Uniform and homogeneous illumination in any desired shape

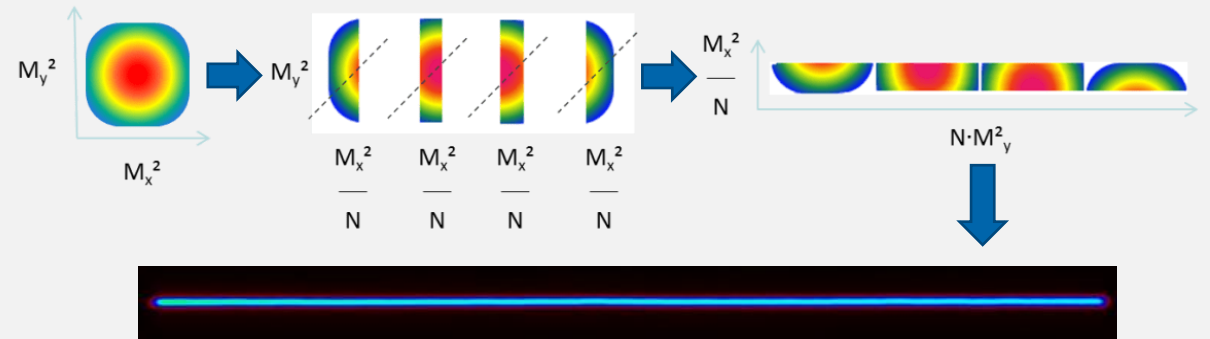


Beam Transformation

Asymmetrical → Symmetrical beam

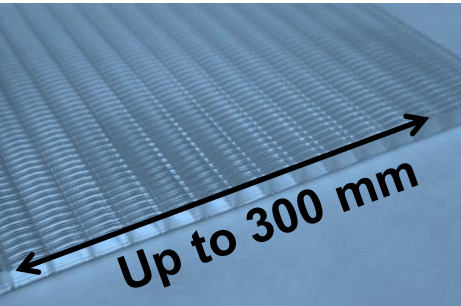
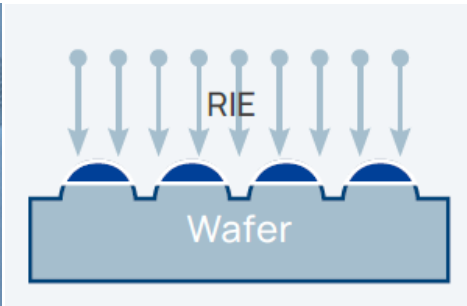
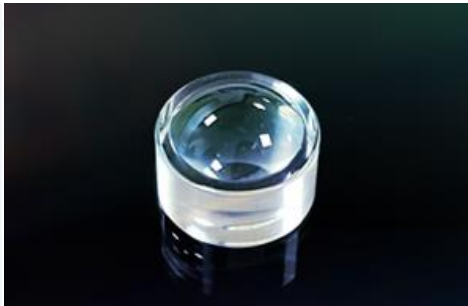
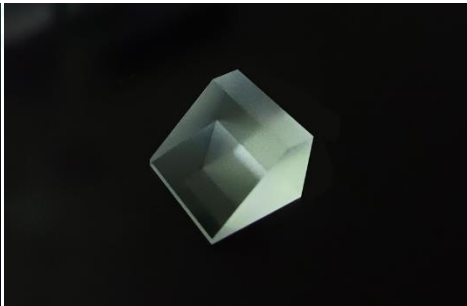
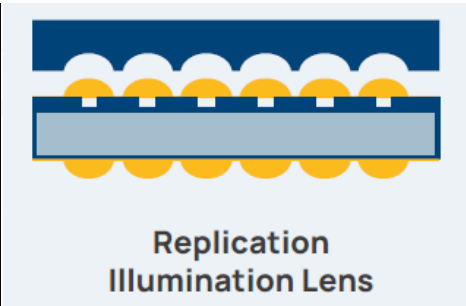
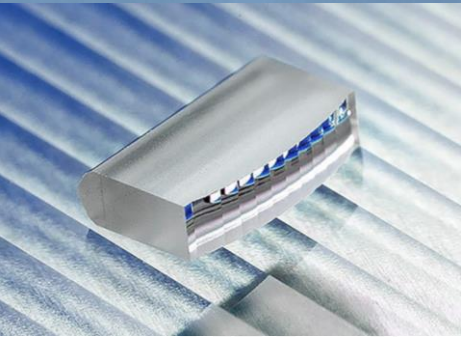
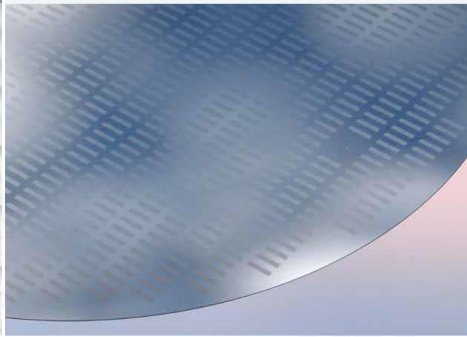
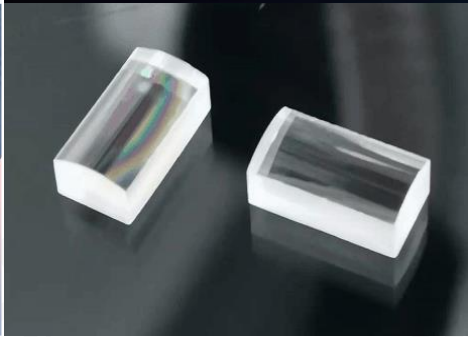
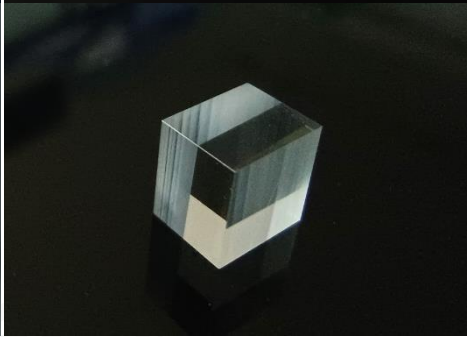
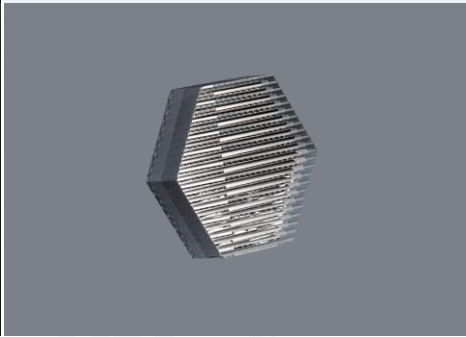


Symmetrical beam → High density line beam

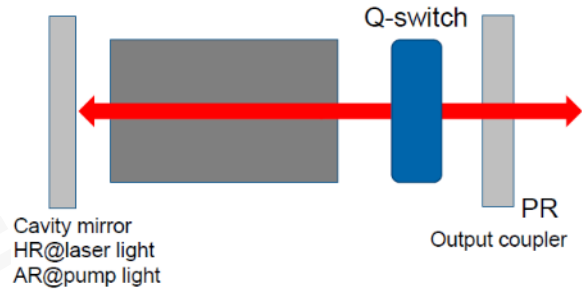


The right photon at the right place and time!

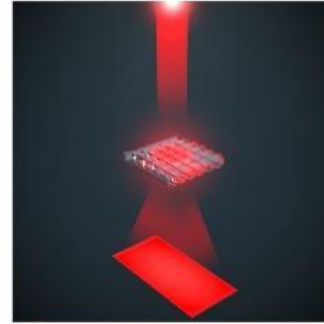
Core Competence – Optics Manufacturing

Wafer Level Simultaneous Structuring	Wafer Level Photolithography-RIE (reactive ion etching)	Precision Glass Molding	Cold Processing	Nanoimprint
				 <p>Replication Illumination Lens</p>
				
<p>With inorganic materials: Glass, Fused Silica, Silicon, CaF₂</p>				<p>With polymer on glass</p>
<p>High LIDT Optical Coating: Anti-reflection, high-reflection, beam splitter, band filter, and various customization (UV, VIS, IR)</p>				

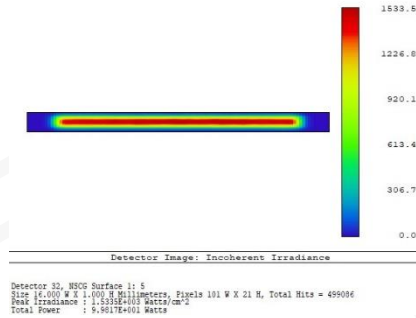
Core Competence – Automotive



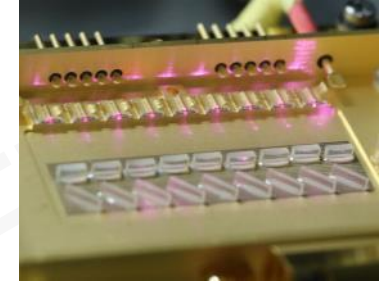
Q-switch DPSS Laser Transmitter Design



Advanced ROE Beam Shaping Optics Design



Design and Simulation



High Power Diode Laser Design and Assembling



Automotive Grade Laser Design and Qualification



Optical Assembly Automation



Laser Testing and Characterization



Laser Assembly Automation

A Unified QM System in the Corporate Ensures Reliable and Premium Products

ISO9001 Certified Quality Management System (QMS)

ISO14001 Certified Environmental Management System (EMS)

IATF16949 Certified Automotive Quality Management System

ISO45001 Certified Occupational Health and Safety Management System

Failure Mode and Effect Analysis (FMEA)

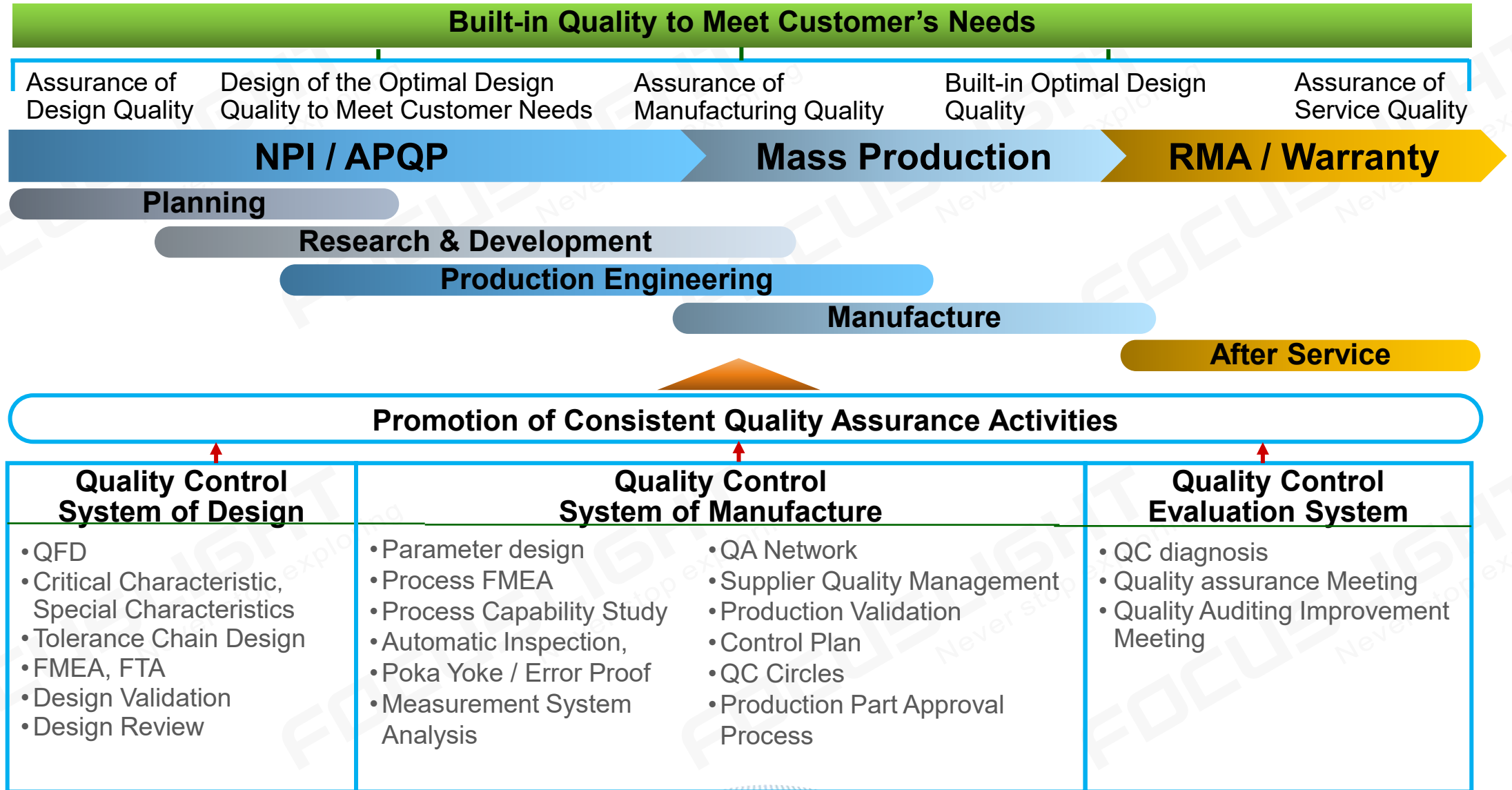
Statistical Process Control (SPC)

Production Traceability Database

Control Plan (CP)

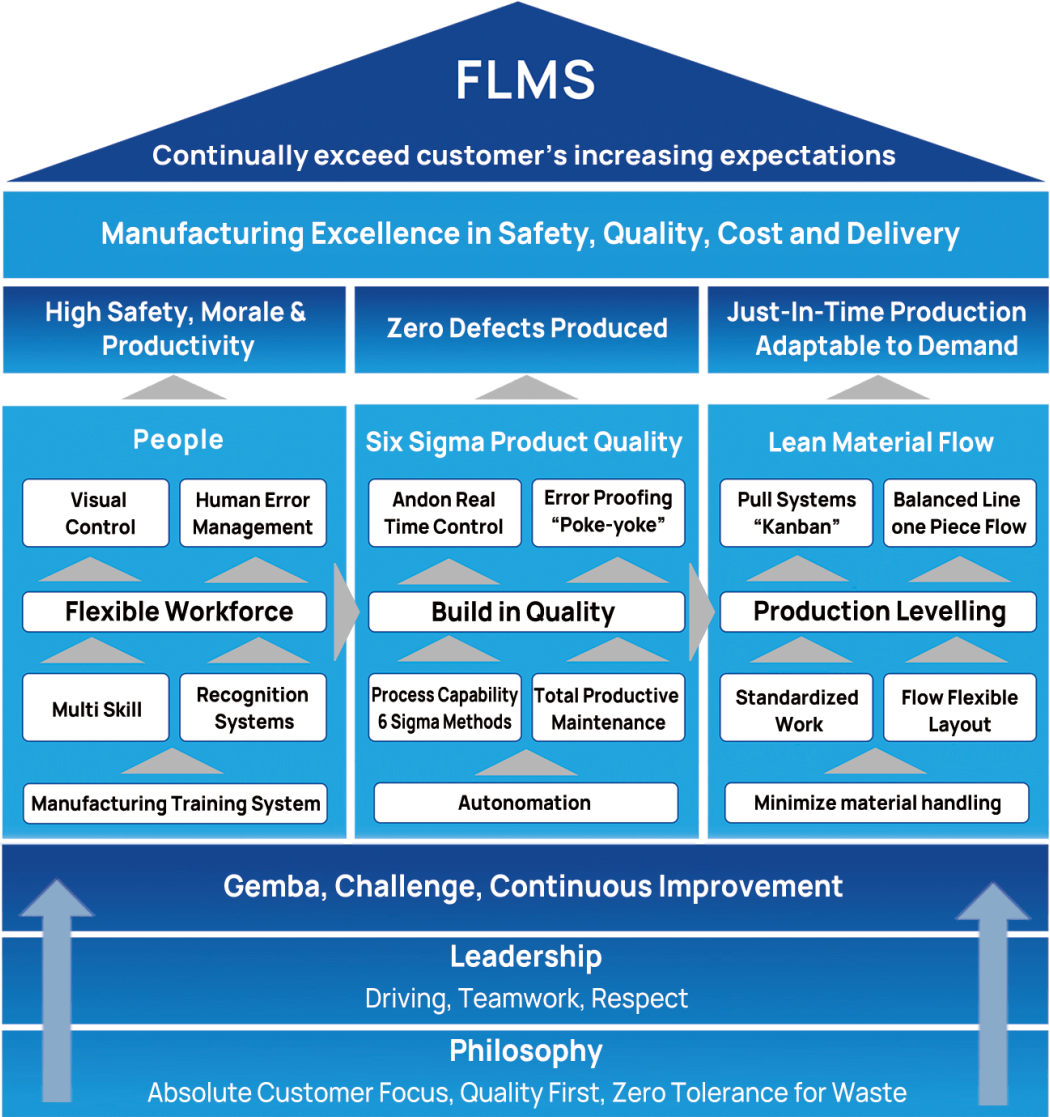


Quality Assurance System



Focuslight Manufacturing System (FLMS)

Focuslight Manufacturing System (FLMS)



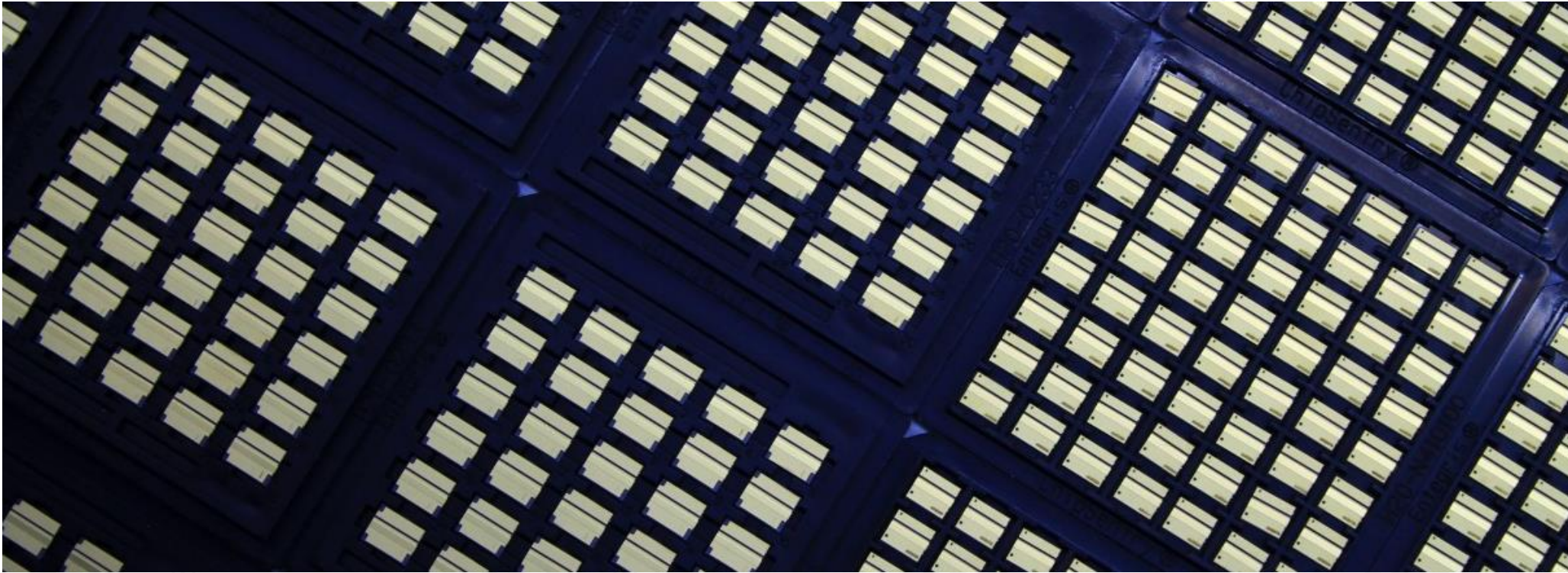
Manufacturing Excellence

- Apply the **lean manufacturing practices** to all production lines, including automotive, diode laser ones and laser optics business
- **Absolute customer focus, zero tolerance of waste, and continuous improvement** philosophy
- **Significantly reduced** cycle time, improved manufacturing efficiency, and lowered RMA yield and manufacturing cost.
- Adopting **automation and advanced production management system**
- **SOP** of the first LiDAR transmitter project with an international automotive tier 1 customer
- IATF 16949 certified and VDA 6.3 audited



Manufacturing Capacity – Advanced Materials

10+ years high-volume manufacturing experiences + self-owned core technologies



Monthly Advanced Materials Manufacturing Capacity > 2M pcs

Manufacturing Capacity – Diode Laser Components

Packaging & Assembling



Optical Assembling



Testing & Measurement



Quality Inspection

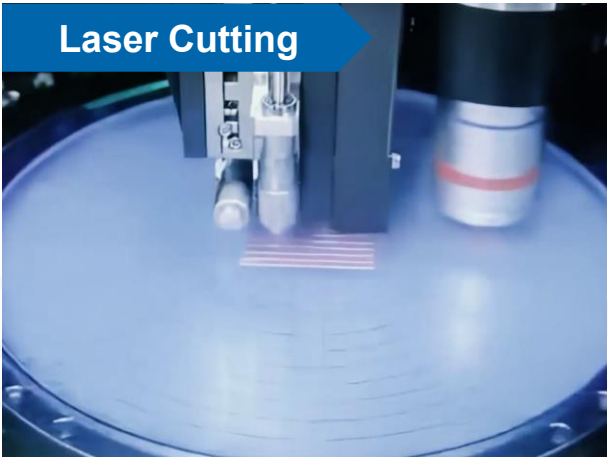
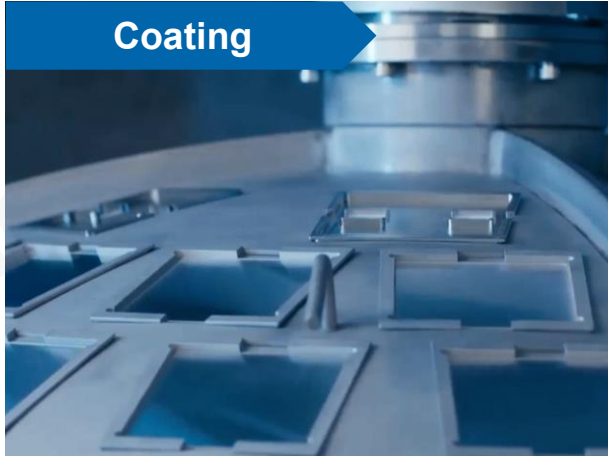


Burn-in & Lifetime Test



Yearly Diode Laser Manufacturing Capacity > 500K pcs
Burn-in Capacity 600K pcs/year

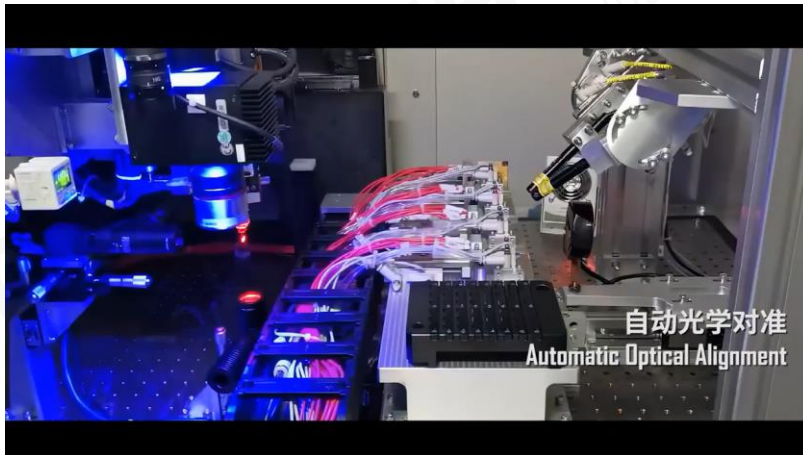
Manufacturing Capacity – Laser Optics Components



Monthly Micro Optics Manufacturing Capacity > 3 million pcs

Automation Powered Manufacturing Excellence

Automatic Optical Alignment



Automatic Assembly



Laser Optics Production Line



LiDAR Transmitter Production Line



[YouTube link](#)

Global Facility/Capacity Expansion - China



Focuslight HQ, Xi'an, China

13787m² facility with 3710m² clean room space for **diode laser components & automotive LiDAR Tx module** production lines



Hefei, China

A new facility of ~25,000 m² focused on **pan-semiconductor application solutions** will be constructed.



Haining, China

UV-LLO and UV-SLA systems being fully deliverable from here



Shaoguan, China

A new facility of ~15,000 m² focused on **medical and health application solutions** is being constructed



Dongguan, China

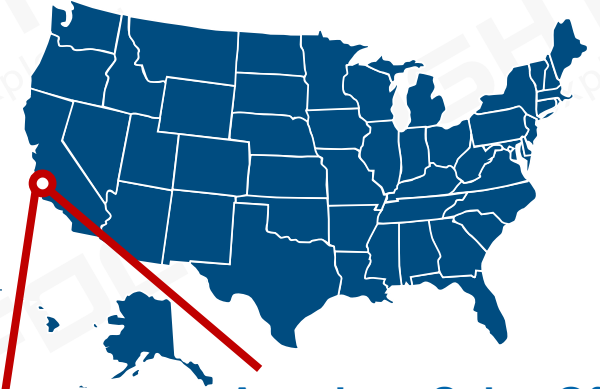
Total 65,000m² of building to be constructed. #1 and #3 buildings with ~6000 m² of clean room space has started operating in September 2022. Monthly **micro-optics** manufacturing capacity > 3 million pcs

Global Facility/Capacity Expansion – Europe & USA

Dublin, Ireland
EMEA Sales office
and R&D staff being
important parts of our
global presence



Neuchâtel, Switzerland
1,150m² of cleanroom area in two
facilities – specially for **wafer-level**
production of industrial and
automotive optics



Americas Sales Office
being an important part
of our global presence

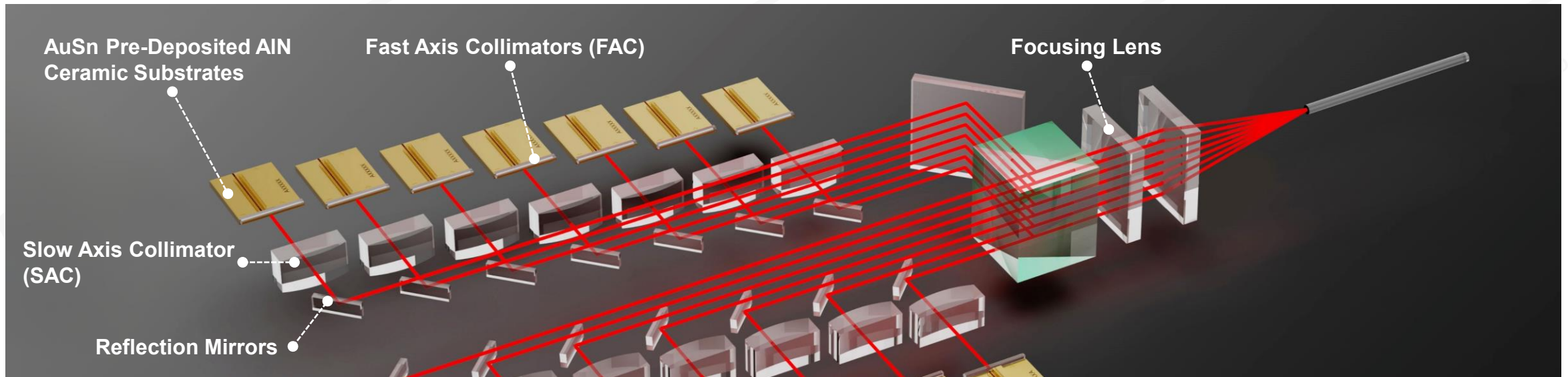


Dortmund, Germany
13000m² facility with 2870m² production area
Extension of **high-volume micro-optics wafer** production line
(FAC /SAC) with manufacturing space increased by 150%
Expansion of UV laboratory finished



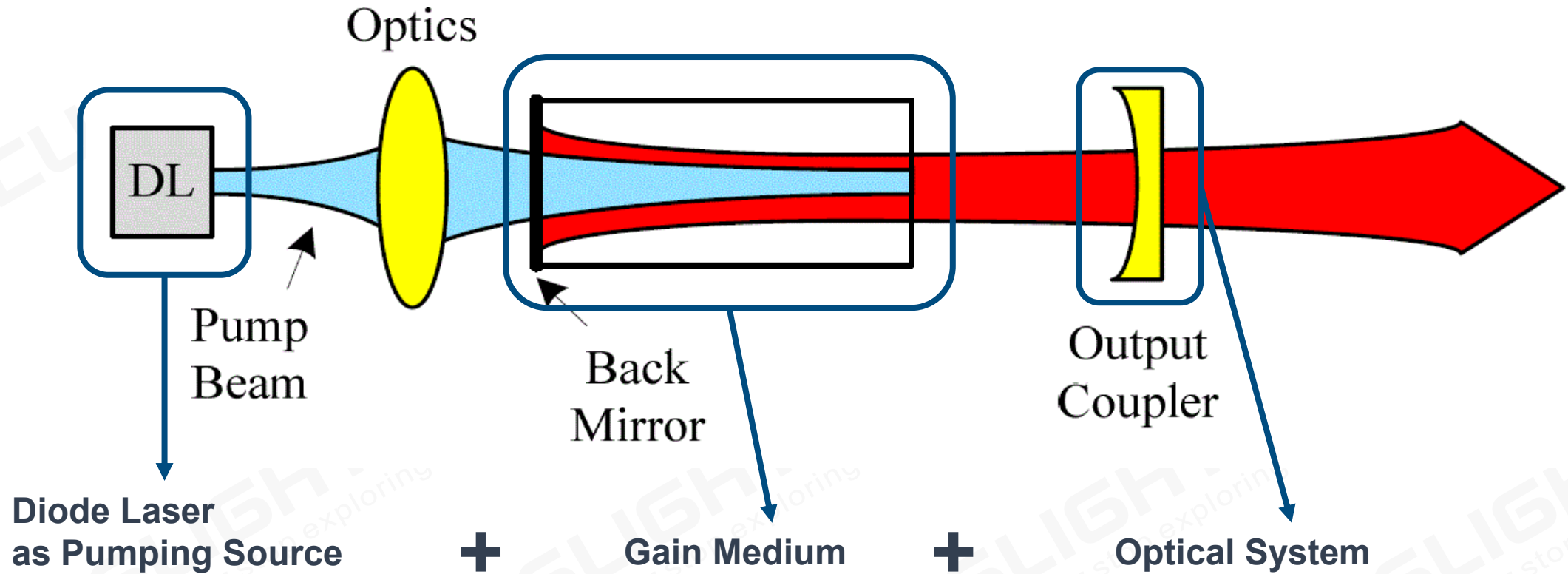
Silicon Valley, USA
The **new innovation lab** has
been set up with our Chief
Scientist working here

Applications – Fiber Laser Pumping



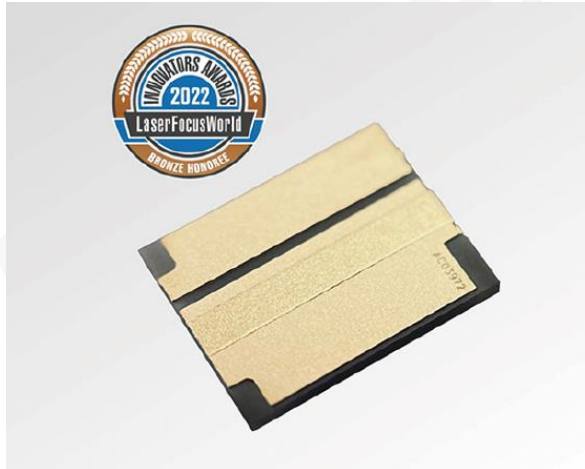
- **AuSn pre-deposited ceramic substrates** – stable and reliable thanks to the high thermal conductivity and suitable thermal expansion coefficient;
- **Fast axis collimators (FAC) and slow axis collimators (SAC)** – fundamental and efficient solutions for shaping the beam emitted by the pumping sources;
- **Reflection mirrors** – highly accurate and efficient in reflection, reducing optical signal losses;
- **Focusing lenses** – coupling the collimated laser beam precisely into the output fiber;

Applications – Solid State Laser Pumping



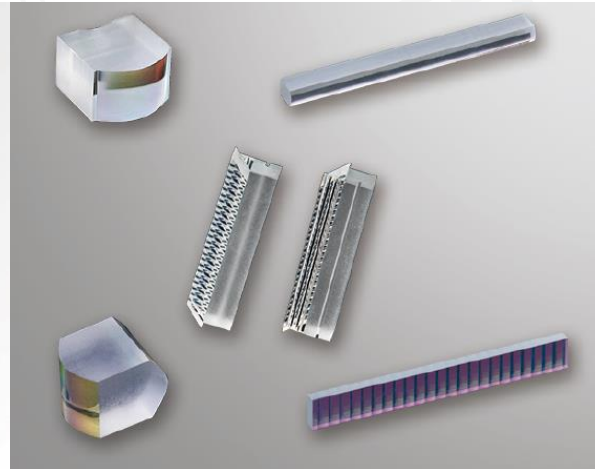
Diode Laser: ↓ Footprint ↑ Reliability ↑ Efficiency ↓ Cost

Applications – Blue Laser



AuSn Pre-Deposited Substrates

For optical cooling of the blue diode laser



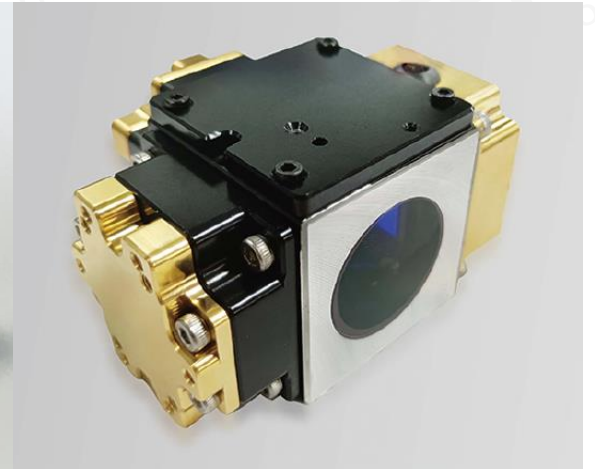
Beam-Shaping Optics

For highly efficient use of the photons



Laser Engraving Modules

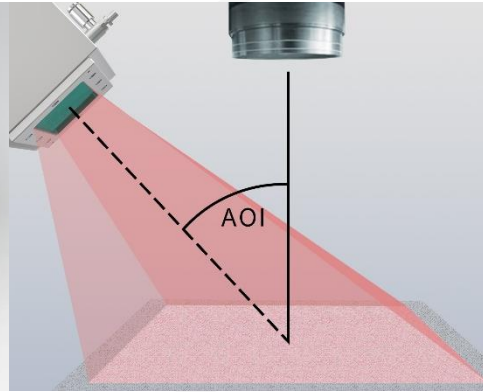
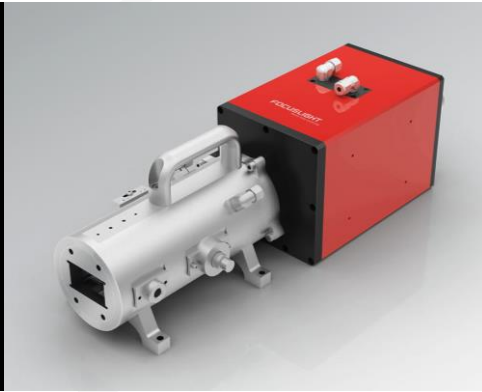
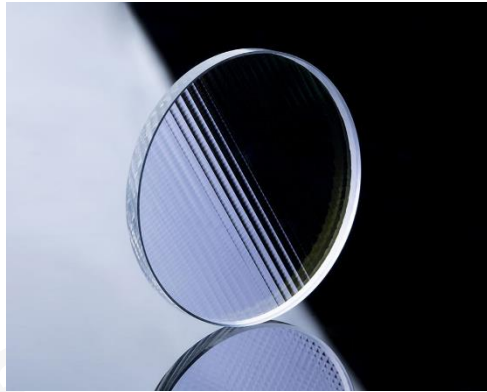
With 20W output (typ.) in 10 x 5 x 5 cm dimensions



Lighting Modules

With 8,000 lm output (typ.) in 7.5 x 6.5 x 4.5 cm dimensions

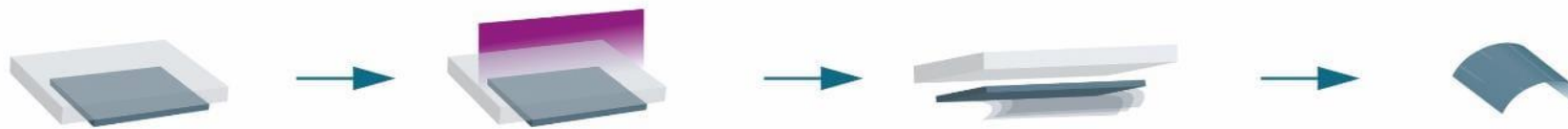
Application – Semiconductor



- Beam homogenization technology powers **lithography** illumination system – key optical component in steppers
- > 15 years supply to the major manufacturer of semiconductor lithography tools
- Laser system solutions with high power density and different beam profiles, designed for various **laser-based wafer annealing processes** including IGBT backside annealing and SiC annealing
- Off-axis beam shaping technology powers laser surface treatment as well as surface inspection
- Typically used in **solar cell industry**
- Beam shaping on UV solid-state laser, 30000:1 aspect ratio is achievable
- Up to 1000 mm long UV Line generation system enabling **OLED laser lift-off** process
- Next-gen LTPS **solid-state laser annealing** process.
- Based on 976nm diode laser with adjustable beam output and >97% homogenization in energy distribution
- Ideal for **Mini / Micro LED manufacturing processing**, e.g. laser mass transfer, laser mass soldering, and laser chip repair

Applications – Display

- Several tens of beam shapers (plasma display pixel structuring)
- Several green 100 mm line beam systems (laser lift-off)
- > 600 mm UV line beam production system (laser lift-off)



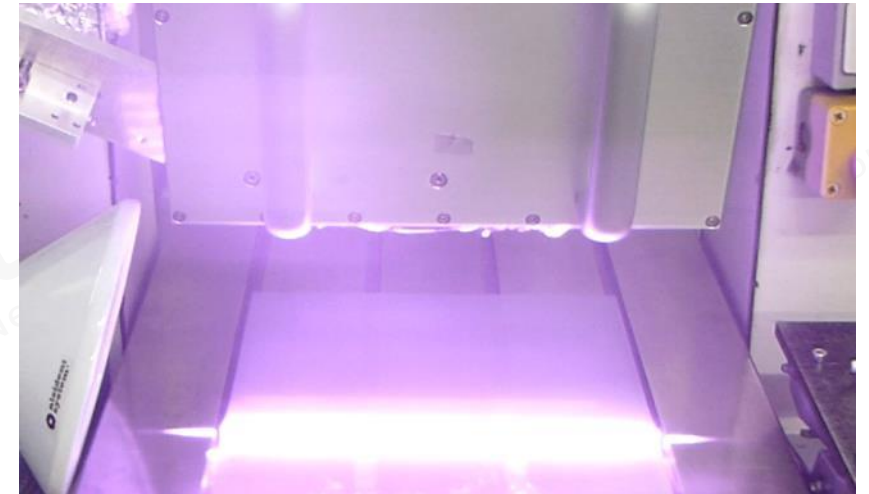
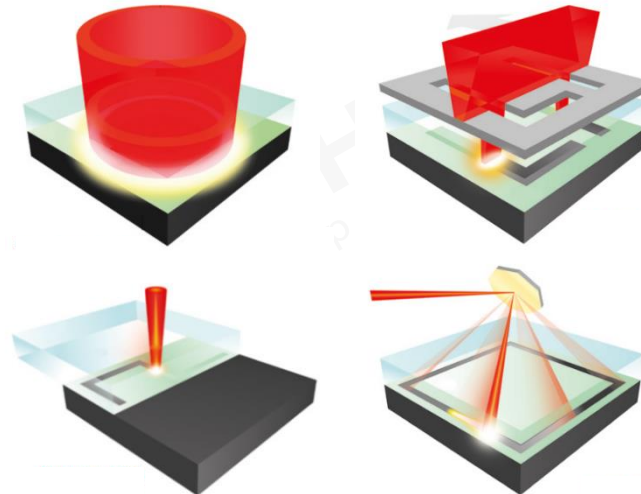
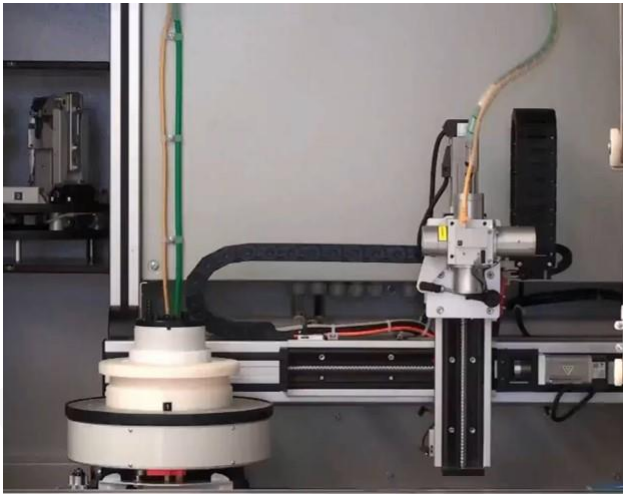
This graphic shows the laser lift off process.

Pre-production stage:

- Laser-induced thermal imaging process (LITI) with IR diode lasers
- Thermal optimization of TCO layers with Focuslight Line Beam Technology
- Low-temperature polysilicon annealing (LTPS) for AMOLED and high-resolution LCDs

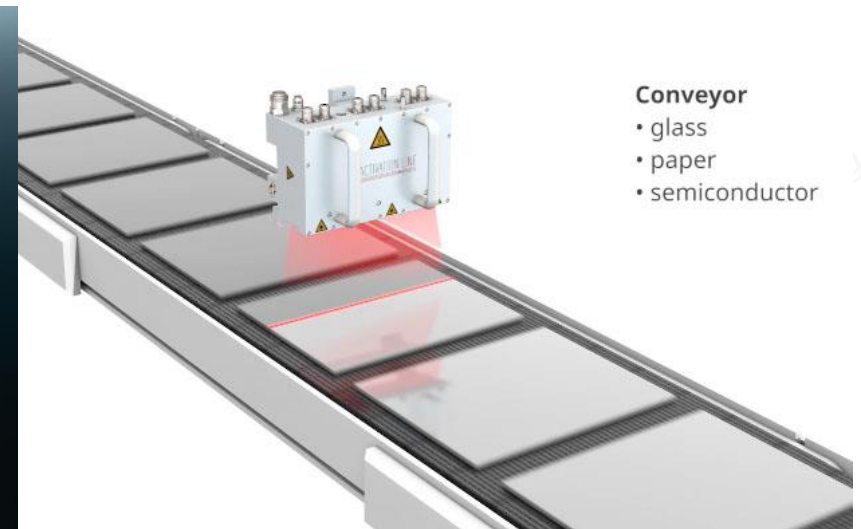
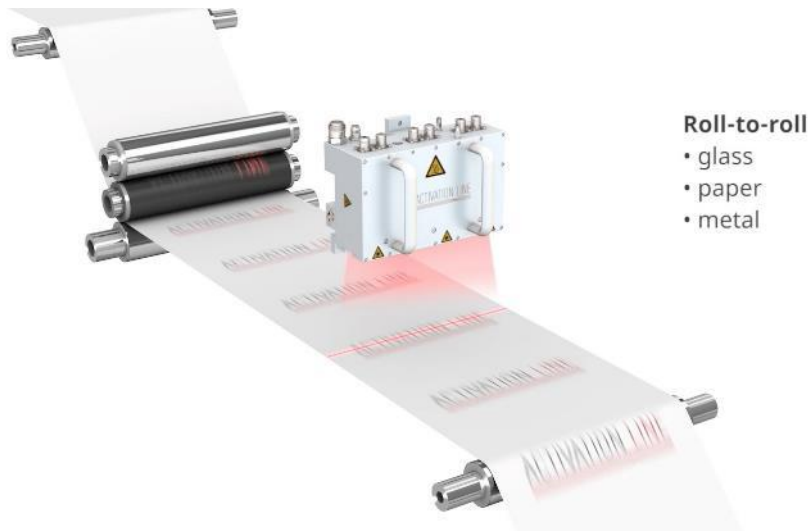
Applications – Welding

- Laser transmission welding of thermoplastics in the wavelength range 808nm-980nm
- Simultaneous welding of thermoplastics with Focuslight Line Beam Technology
- Cutting, welding and soldering of metals
- Metal surface finishing with Focuslight Line Beam Technology
- Corrosion- and abrasion-resistant hard metal coatings on steel



Applications – Coating

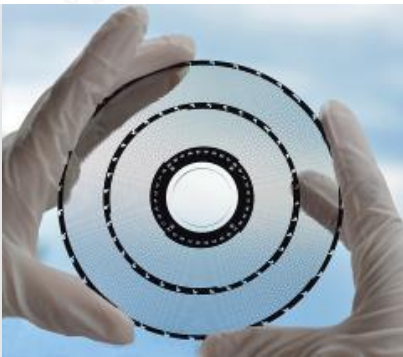
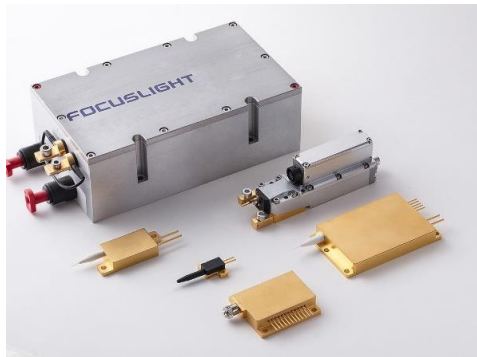
- vRTP (very Rapid Thermal Processing) of functional coatings with Focuslight Line Beam Technology:
- Large-scale, energy-efficient and precisely controlled processing
- ... for a large variety of substrate materials (metal, glass, polymer, paper etc.)
- ... for a large variety of processes (annealing, crystallization, drying, sintering etc.)
- ... for a large variety of coating materials (semiconductors, metals, TCOs etc.)



Applications – Medical and Health



- **Direct diode laser solutions, fiber coupled laser solutions, and optical components** for medical and aesthetic uses including laser hair removal, laser body sculpting, dental, surgery, laser fluorescein angiography (LFA), etc.
- Strong positioning in **professional hair removal** industry worldwide
- Fast growth in **consumer health solution** and **body sculpting** laser modules, massive production project awarded from world-class home-use aesthetic equipment manufacturer
- Imprinted polymer lens, diffractive elements (DOEs), square lenses arrays for various applications such as **waveform sensing, 3D metrology optics (odontology), health monitoring**
- **Nipkow discs** for **confocal microscopy**



Applications – Optical Communication

Refractive Optics

- Focusing / collimating microlens
- Prism integrated MLA
- Microlens arrays
- Si refractive microlens arrays



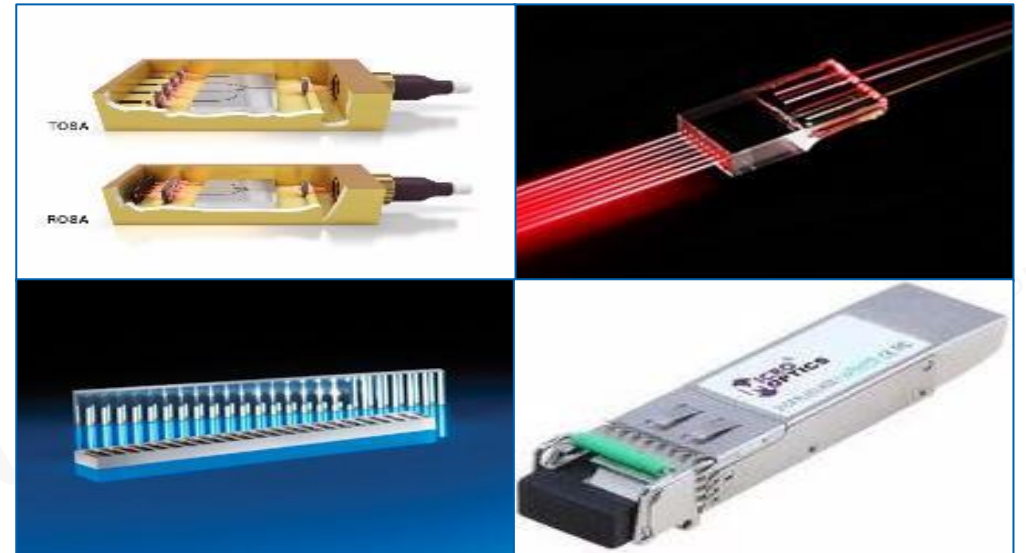
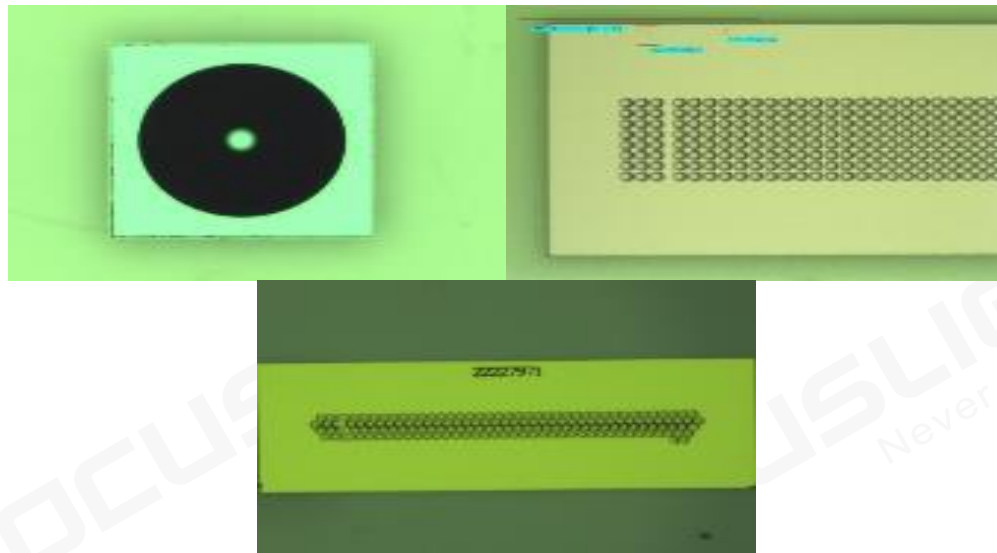
Transceiver (TROSA, ROSA, TOSA *)

Fiber couplers for PICs

Co-packaged optics

Wavelength selective switches

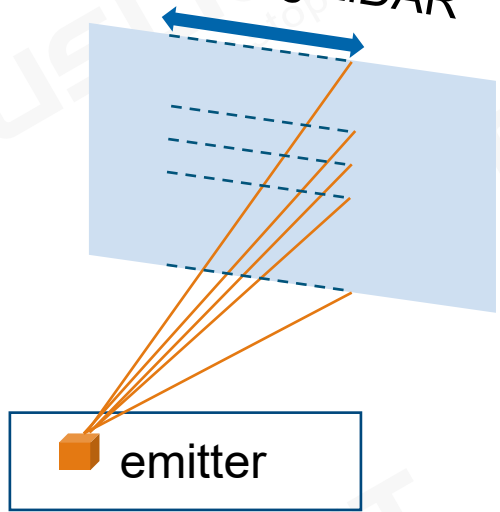
Extended beam connectors



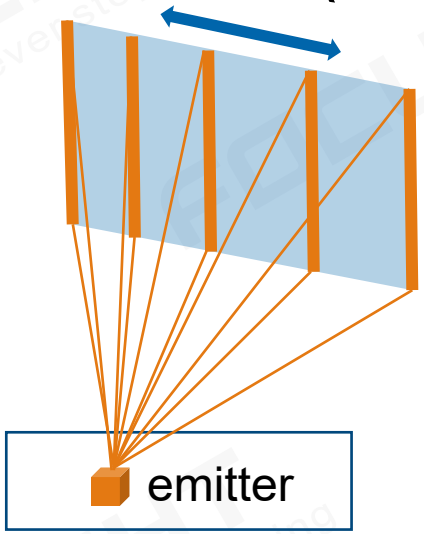
* TROSA = Transmit & Receive Optical Sub Assembly, ROSA = Receiver Optical Sub Assembly, TOSA = Transmitter Optical Sub Assembly

Application – Automotive LiDAR

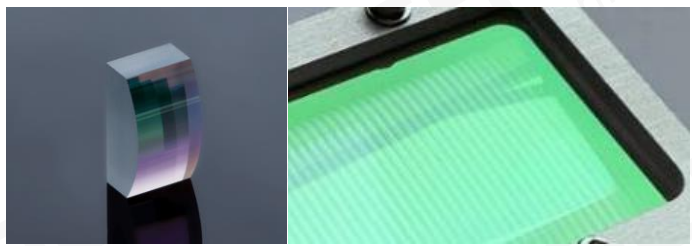
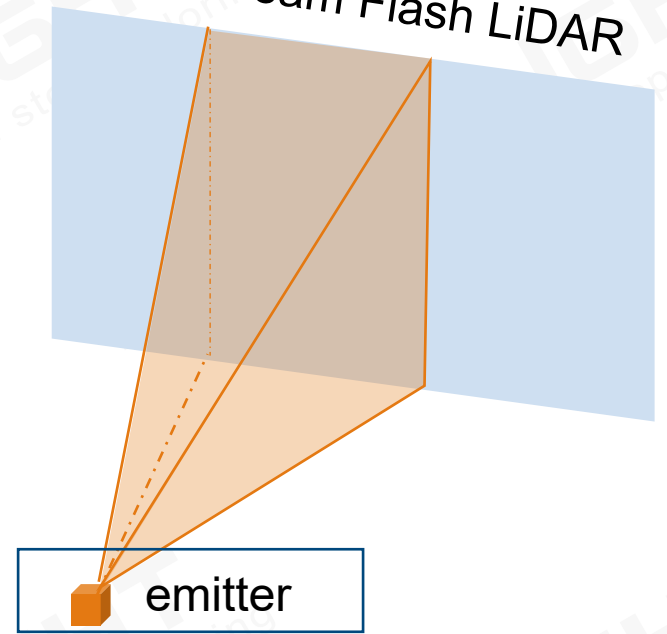
Mechanical 360°
spinning LiDAR



Hybrid Solid State
Line beam 1D steering
LiDAR



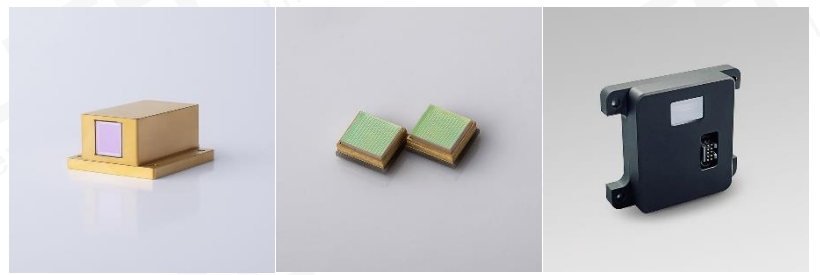
Pure Solid State
Area Beam Flash LiDAR



Automotive-grade optics
and subassembly



Line Beam Transmitter Modules

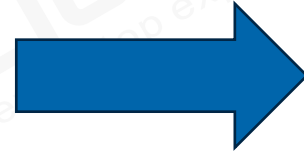


Flash Transmitter Modules

Application – Automotive Lighting

Refractive and Diffractive Optics

- Microlens arrays
- Diffractive elements
- Spatial filter arrays
- Hexagonal / round / cylindrical / square lens arrays



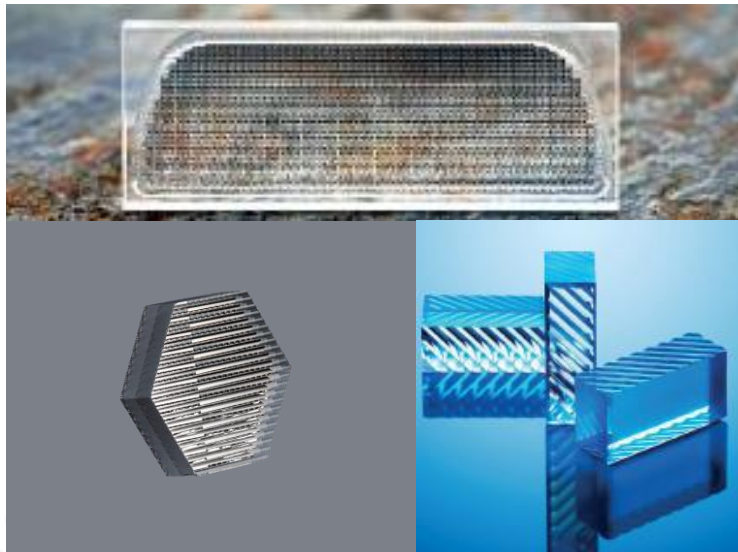
Headlamps

Exterior projections

Interior projections

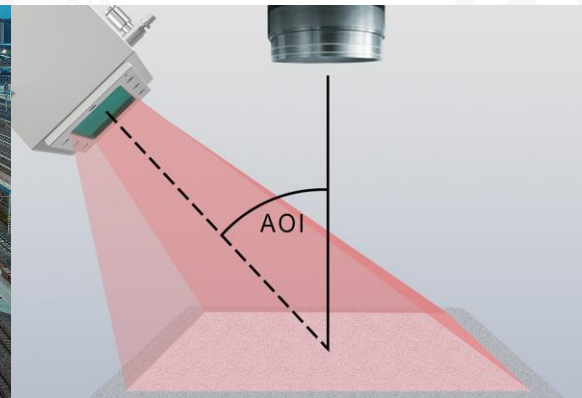
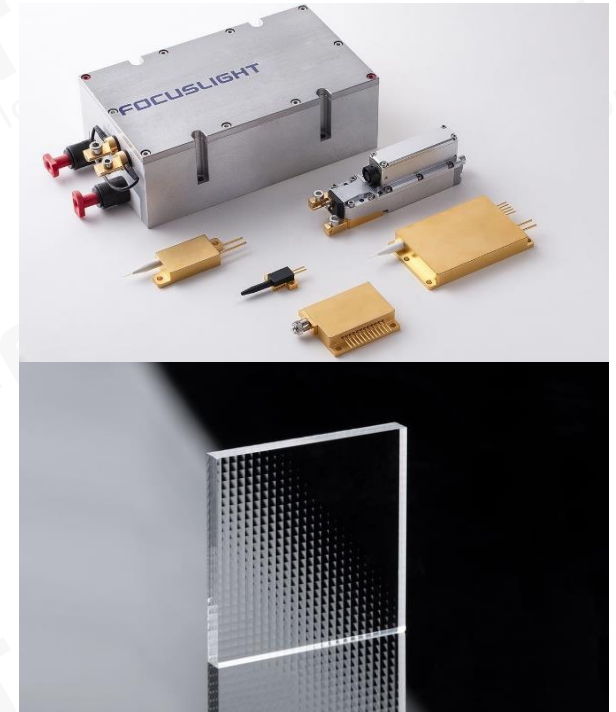
LiDAR Receiver

LiDAR Transmitter



Applications – Illumination and Machine Vision

- **Diode laser sources** with different power and wavelength ranges, **Fiber coupling modules (FCM)** products and **micro-optic components** for the **illumination** application.
- **Homogenizers, diffusers, and beam shaper modules** can disperse laser light in one direction up to a full illumination angle ranging from a few mrad to over 160°, which illuminates the target area precisely and uniformly (95%), providing high uniformity and high-resolution illumination system for **CCD/CMOS imaging and surface inspection system**, for instance, **for rail transit and bridges**, and in various **industrial application fields**.



Sales Network



- Worldwide established distributors
- Direct sales offices in China, Ireland and US
- Manufacturing site in Xi'an, Dortmund, Dongguan, Haining, and Neuchâtel

Summary

- Diode laser light source leader and beam shaping expert
- One stop source from active devices to passive optics, from components to modules to application subassemblies
- Total solution, versatile customization service and field service provider
- Strong RDE capability, high volume production capacity and low-cost manufacturing
- Strong IP position in diode lasers and laser optics
- Financially healthy and strong financial backing from investors for long term growth

- **Your committed and reliable long-term partner in diode lasers and laser optics**

THANK YOU



FOCUSLIGHT
Never stop exploring