



LUMILOOP

LASER-POWERED SENSOR SYSTEMS

**How to laser-power everything, and
how to start a business based on that**



Industry-Academic Forum on EMC 2026
LUMILOOP GmbH, Dresden, Germany



Overview

- Power-over-Fiber Technology
- Fields of Applications
- History
- Why LUMILOOP?
- Team
- Location



Patented Power-over-Fiber Technology

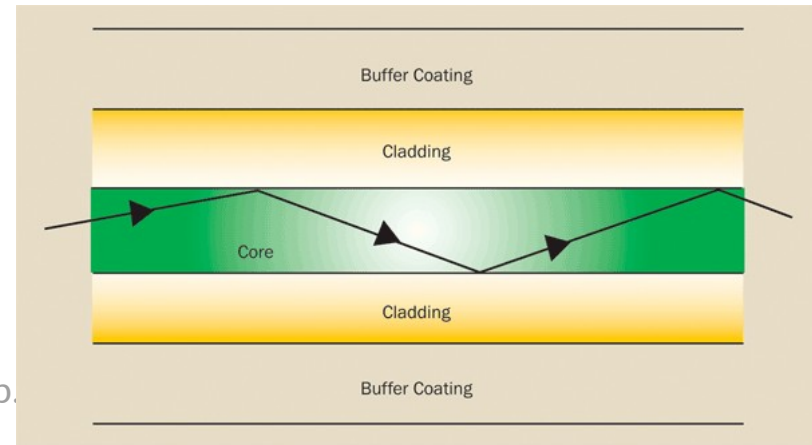
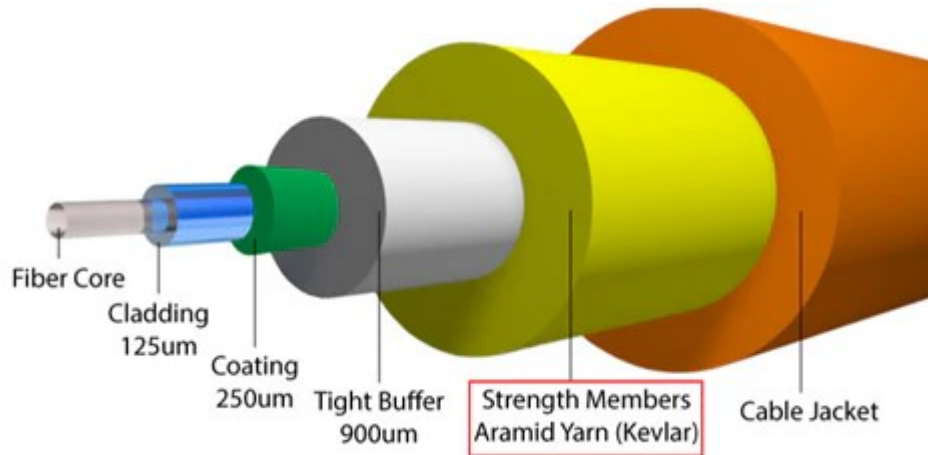


- Optical energy and data transmission over fiber
- Galvanically isolated, continuous power supply
- Closed-loop optical power regulation, including eye safety
- Custom optical package and laser power converters



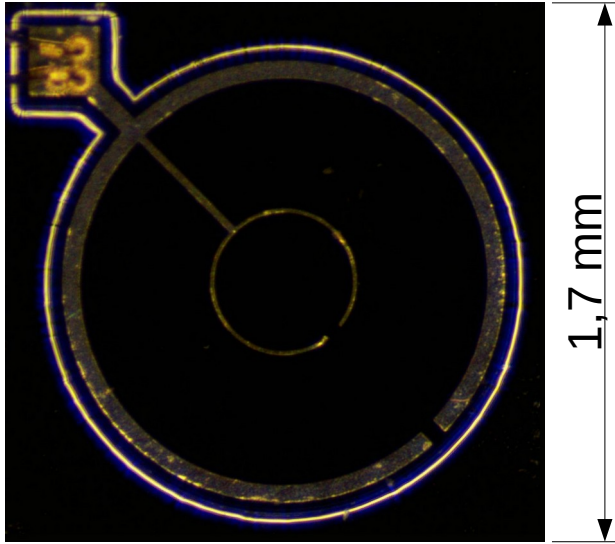
Glass Fiber Basics

- Transmission of optical signals over large distances
- Glass core, diameter comparable to human hair
- Core has a slightly higher refractive index than cladding
- Total reflection at the transition from core to cladding
→ light is only carried in the core

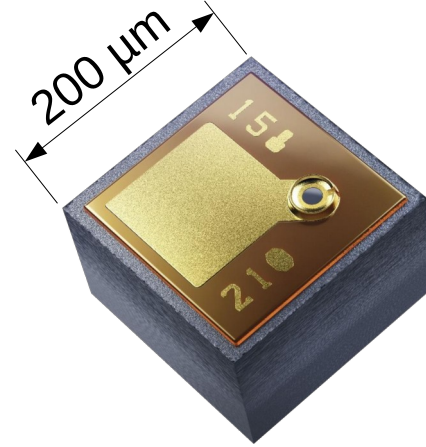




Optical Components: Sensor Interface



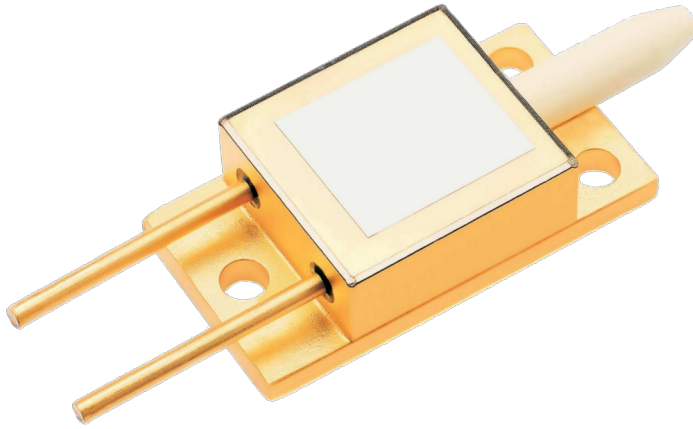
- Laser Power Converter (LPC)
- 2V/3V versions (2/3 junction)
- Efficiency > 55%
- >500 mW electric output



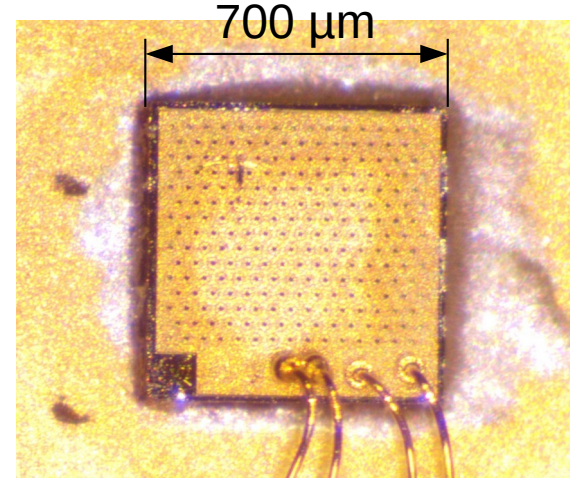
- VCSEL data laser
- Up to 40 GBit/s
- few mW optical power
- -40 °C to +85°C



Optical Components: Power Laser



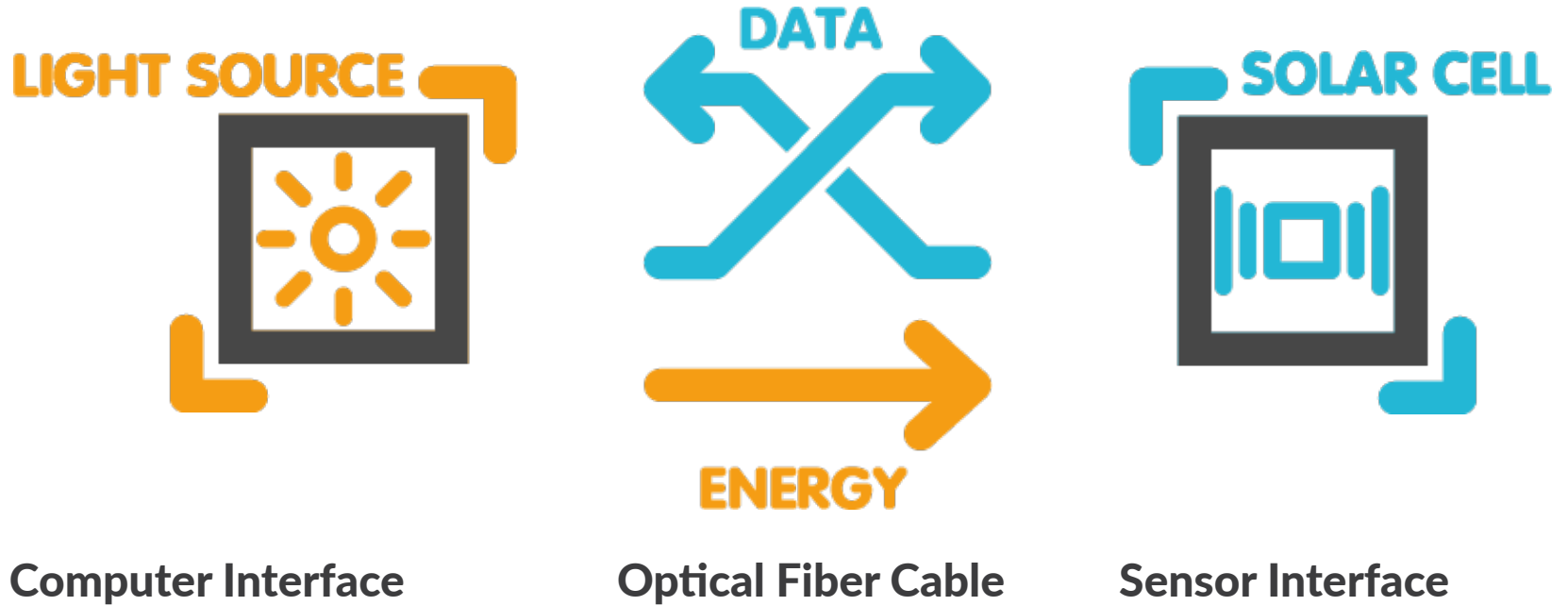
- Edge emitter Laser module
- Fiber coupled
- Actively aligned optics
- Temperature: 10 °C to 40 °C



- Surface emitting Laser
- Bare die
- No optics → end face coupling
- -40 °C to +70 °C



Power over Fiber





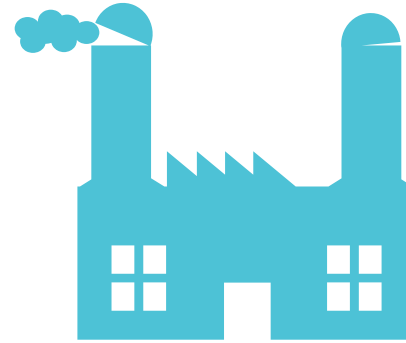
Fields of Application



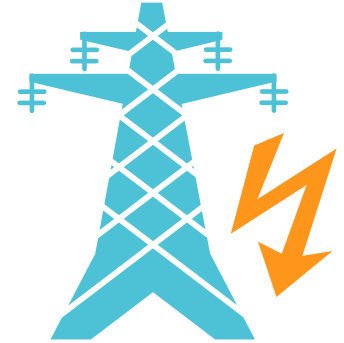
EMC



**Condition
Monitoring**



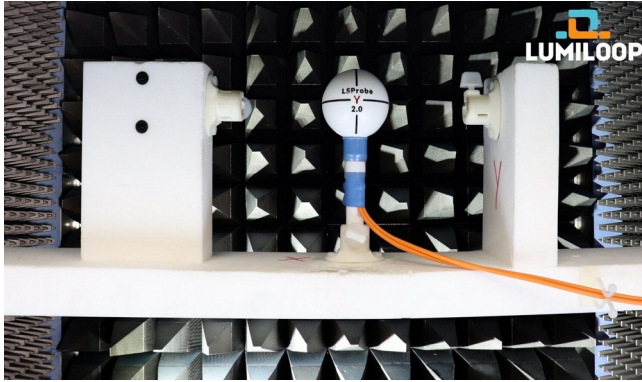
**High Electric and
Magnetic Fields**



High Voltage



Electromagnetic Compatibility Testing



- Reliable 24/7 high-performance testing without influencing the electric field
- High precision and high accuracy
- Measurement rationalization and simplified data transfer



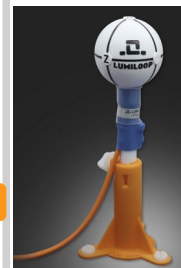
Product Overview

Laser-Powered E-Field Probes

LSProbe 1.2 E-Variant

LSProbe 1.2 F-Variant

LSProbe 2.0



10 Hz

9 kHz

1 MHz

6

8.2 GHz

18 GHz

26.5 GHz

RF Power Meters

LSPM 1.0

LSPM 2.0



Laser-Powered RF Power Meters

LSPM 1.1

LSPM 2.1



Laser-Powered Analog Optical Link

LSAOL 1.2





Condition Monitoring



Quelle: Doberidefrau / pixelio.de

- Continuous sensor supply to the tip of the blade
- Unrestricted, certified interference and lightning protection
- Low installation effort



Condition Monitoring





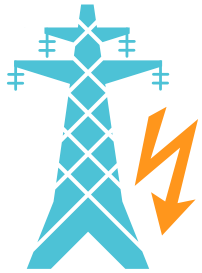
High Electric and Magnetic Fields



- Minimal installation effort
- Certified explosion safety thanks to spark-free energy
- Use in industrial temperature ranges
- Reliable transmission over long distances



High Voltage



Quelle: Erich Westendamp / pixelio.de

- Voltage isolation up to 1 MV through galvanic decoupling
- Continuous operation
- Easy installation and low maintenance



Your Application?!

YOUR SENSOR



- Voltage, current, temperature, acceleration, strain, ...
- Development and manufacturing of customized turn-key sensor systems, from sensor to software integration
- Low-power redesign of existing sensors
- **Contact us to discuss your sensor solution!**



History

- 2012: Started research on Power over Fiber (PoF) at TU Dresden
- 2013: Public funding for commercialising PoF technology
- 2015: **LUMILOOP GmbH** founded, focus on products
- 2015: **LSProbe 1.2 Laser-Powered E-Field Probe** , 6 GHz introduced
- 2016: First employees, build-up of distribution network
- 2017: Synchronized **Multiprobe Systems**
- 2018: **LSPM 1.0 RF Power Meter** , 6 GHz
- 2019: **LSAOL 1.0 Analog Fiber Optic Link**, 6 GHz
- 2020: Doubled floor area, new fully anechoic 3m chamber,
upgraded calibration capabilities to 18+ GHz



History

- 2021: **LSProbe 2.0 Laser-Powered E-Field Probe** , **18 GHz**
- 2022: **LSPM 2.0 RF Power Meter** , **26.5 GHz**
- 2022: **“+” Devices** introduced: Touchscreen and Ethernet Interface
- 2023: **LSPM 1.1** and **LSPM 2.1** Laser-Powered RF Power Meters
- 2024: Initial **ISO 9001** and **ISO 17025 Accredited Calibration** for Electric Field Calibration, CMC: 9 kHz – **18 GHz, 1V/ - 50V/m**
- 2024: Rugged sensor systems for **Condition Monitoring**
- 2025: **ISO 17025 Accredited Calibration** CMC Extension for Electric Field Calibration: 9 kHz – **26.5 GHz, 1V/ - 600V/m**
- 2025: **LSProbe 2.0 E-Field Probe** frequency extension, **26.5 GHz**
- 2025: **Cheers to 10 Years!** LUMILOOP celebrates 10th anniversary
- 2025: **LSAOL 1.2 Analog Fiber Optic Link** with RF Spin Antenna

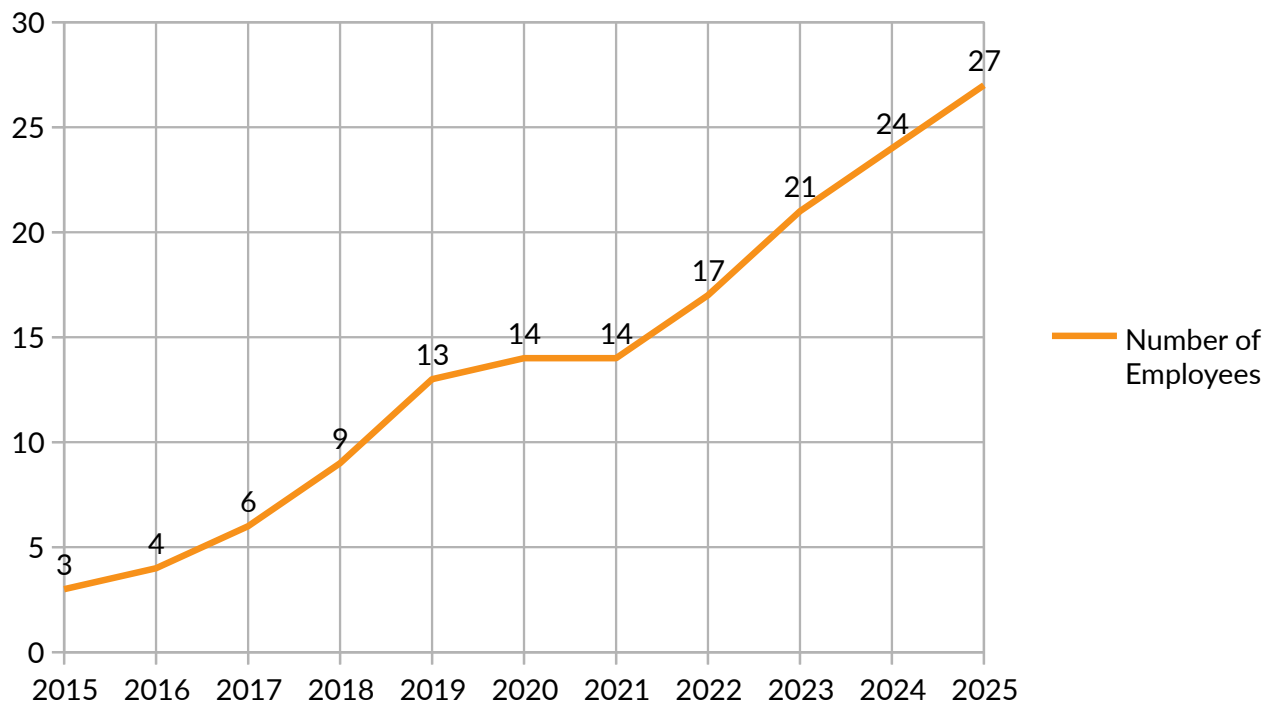


Why LUMILOOP

- Innovative, growing, owner-managed company
- Cutting-edge technology and products
- 15 years of expertise in power-over-fiber
- Engineering, production, accredited calibration and service in one place in Germany
- Worldwide service and calibration partners
- Free software with continuous improvements



Team development







Team: Slow is Not an Option!





LUMILOOP GmbH



lumiloop.de



06/2026

Slide 22



R&D, Production, Service in Germany





Work With Us in Dresden!



Dresden Canaletto View ©Sachsen Magazin



LUMILOOP



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