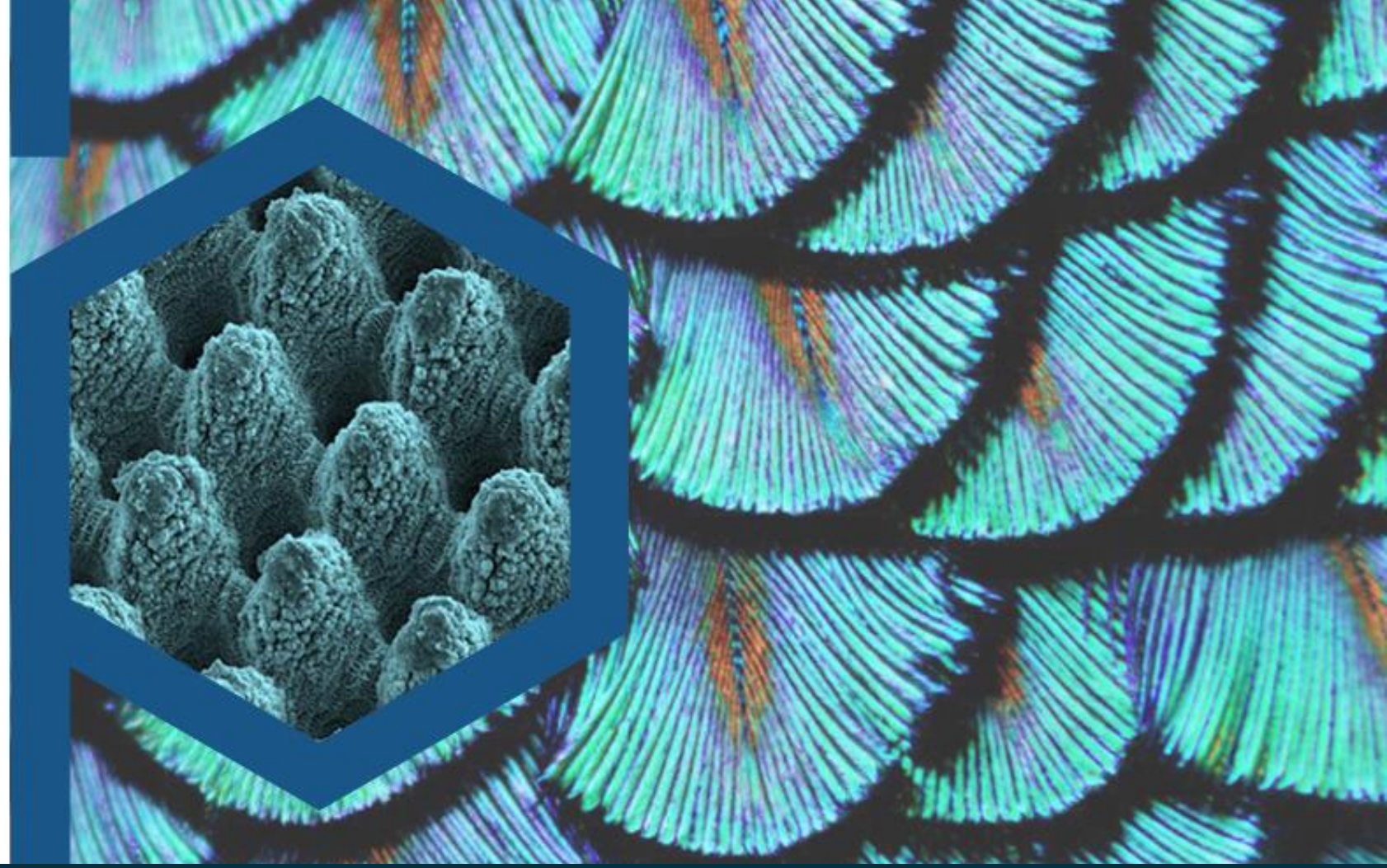


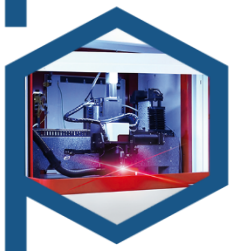
FUNDED BY

PHOTONICS PUBLIC PRIVATE PARTNERSHIP

31st August 2020, Andrés Fabián Lasagni, Technische Universität Dresden

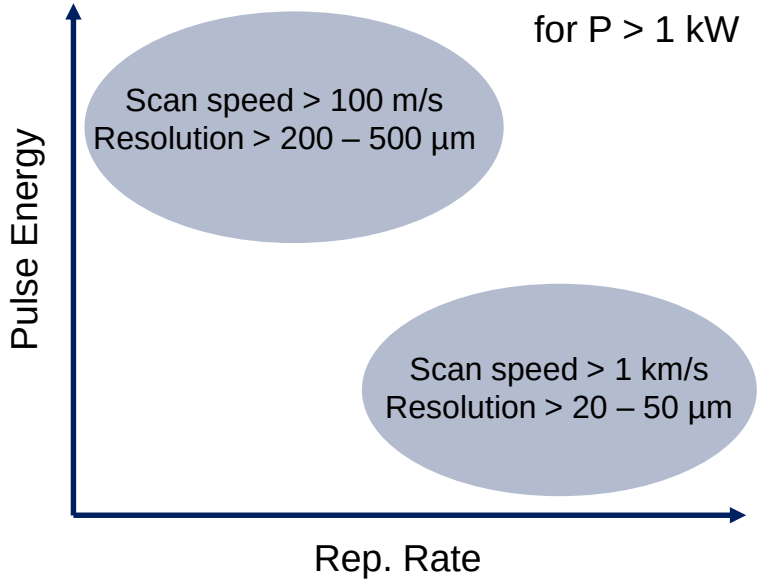
The LAMpAS project

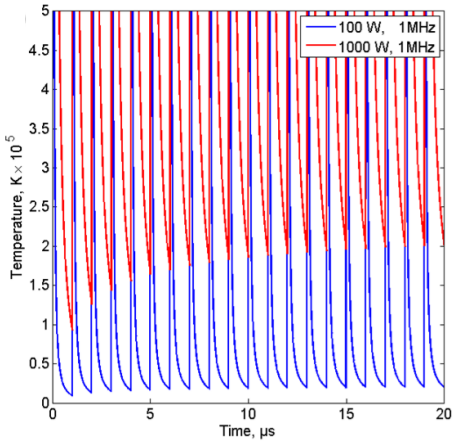
TECHNISCHE UNIVERSITÄT DRESDEN



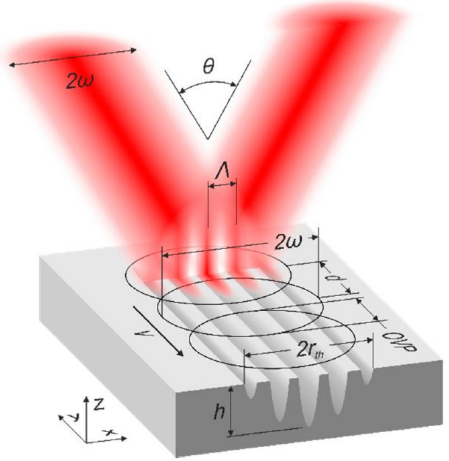
The idea

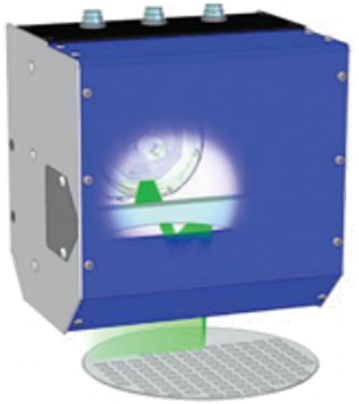
The high-power laser processing paradigm





Heat accumulation!

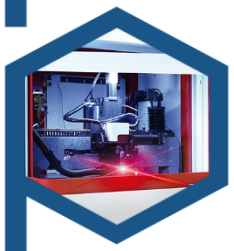




- **Scenario 1**: low pulse energy (µJ) and high rep. rates (GHz – THz!)
  - Scanning speeds of several km/s required
  - Significant heat accumulation
- **Scenario 2**: high pulse energy (mJ) and moderate rep. rates (few GHz)
  - Large spot sizes
  - Low feature size resolution
- **Scenario 3**: high pulse energy (mJ), moderate rep. rates and utilization of interference patterns!
  - Scanning speeds of some 100 m/s required
  - Lower heat accumulation
  - Higher resolution due to interference pattern!

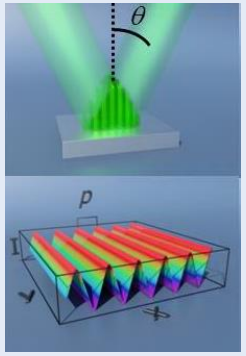
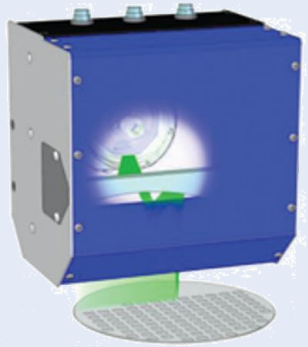
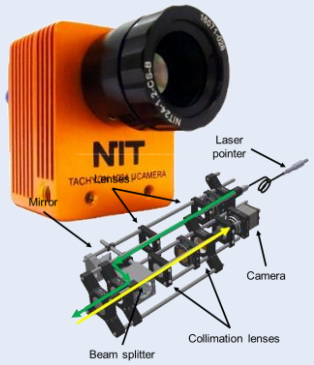
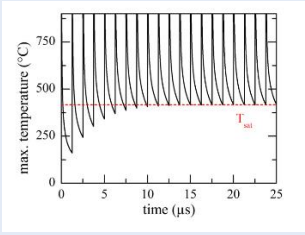
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825132.
It is an initiative of the Photonics Public Private Partnership (**www.photonics21.org**).

PHOTONICS PUBLIC PRIVATE PARTNERSHIP



The idea

“**Multi-beam processing**” with interference patterns on large spots delivered to the material surface by polygon scanners!

High resolution multi-beam processing	High-speed beam deflection	Ultra-short pulse laser ablation	In-line monitoring	System design and integration	Demonstration, validation and simulation
					
Interference Patterning	Polygon scanner	High-power USP laser	Process control	Process development	Product development

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 825132.
It is an initiative of the Photonics Public Private Partnership (**www.photonics21.org**).

PHOTONICS PUBLIC PRIVATE PARTNERSHIP

Objectives

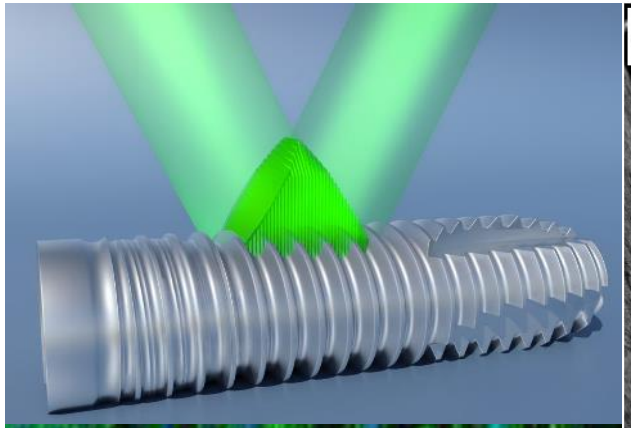
- **Objective 1:** Development of a high power ps-laser source
- **Objective 2:** Development of a high-speed beam delivery system
- **Objective 3:** Development of an in-line monitoring process to assess the functional performances
- **Objective 4:** Development and construction of a laser system integrating the developed sub-elements
- **Objective 5:** Processing of product demonstrators with high performance requirements
- **Objective 6:** Validation of the treated prototypes in relevant environments (TRL 6)

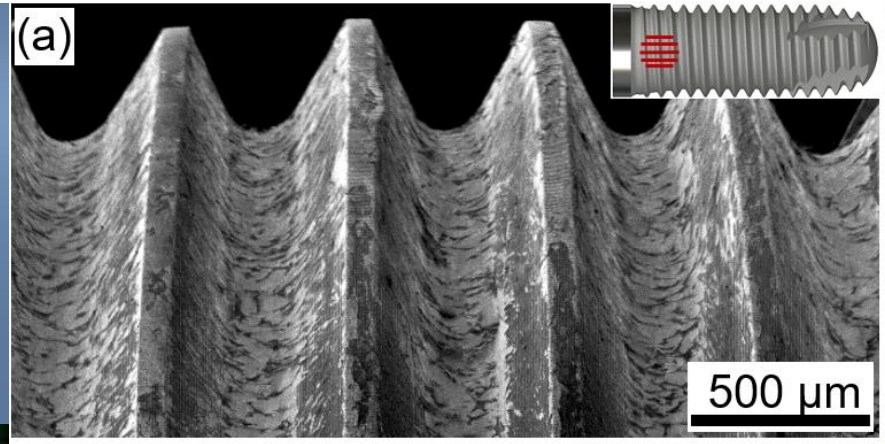
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825132.
It is an initiative of the Photonics Public Private Partnership (**www.photonics21.org**).

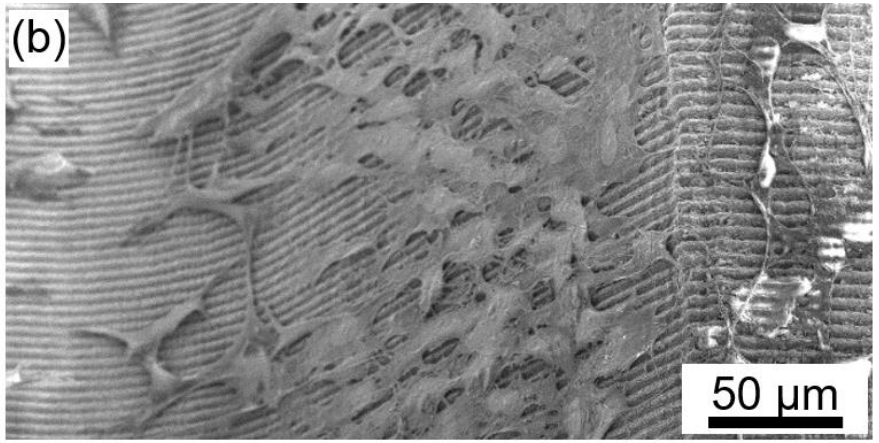
PHOTONICS PUBLIC PRIVATE PARTNERSHIP

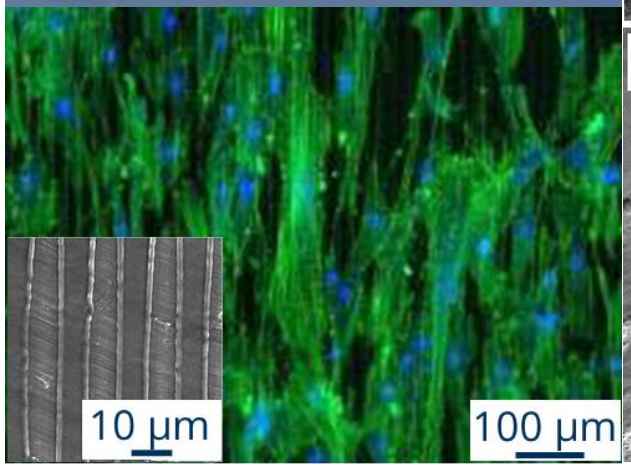
Fabrication of biocompatible surfaces

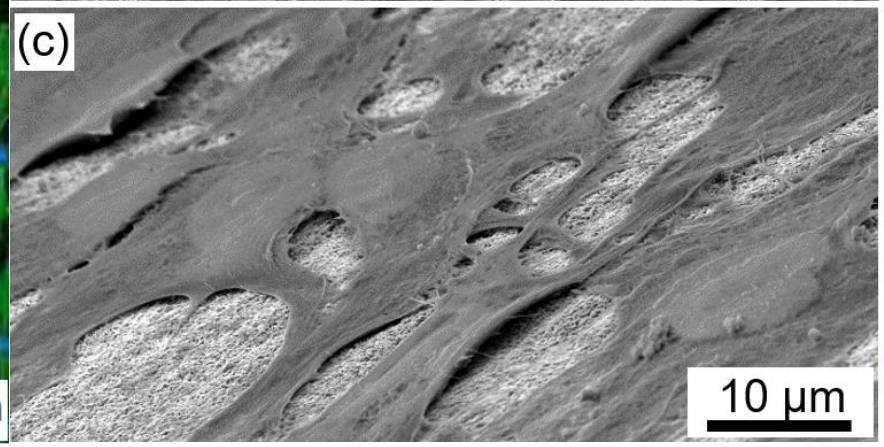
Example of surface functionalization using DLIP on dental implants

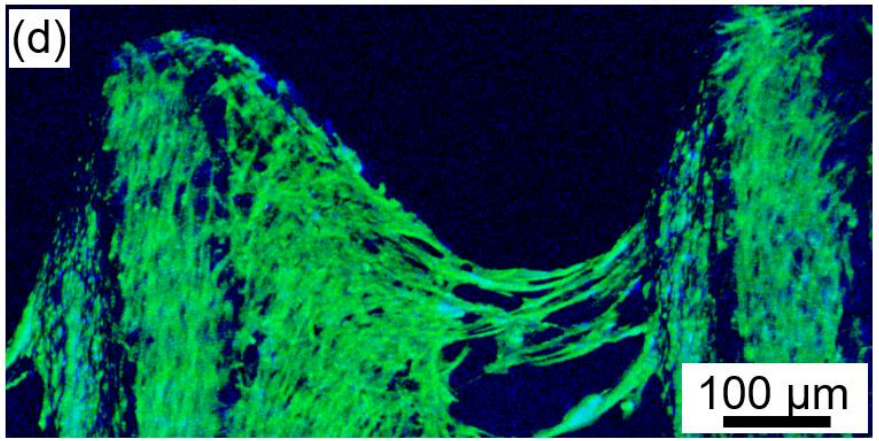










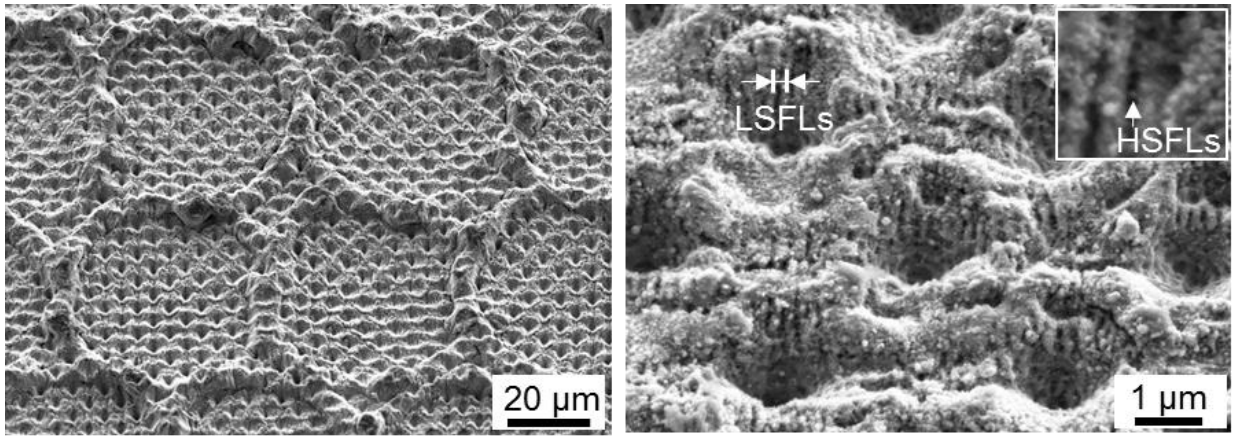


This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825132.
It is an initiative of the Photonics Public Private Partnership (**www.photonics21.org**).

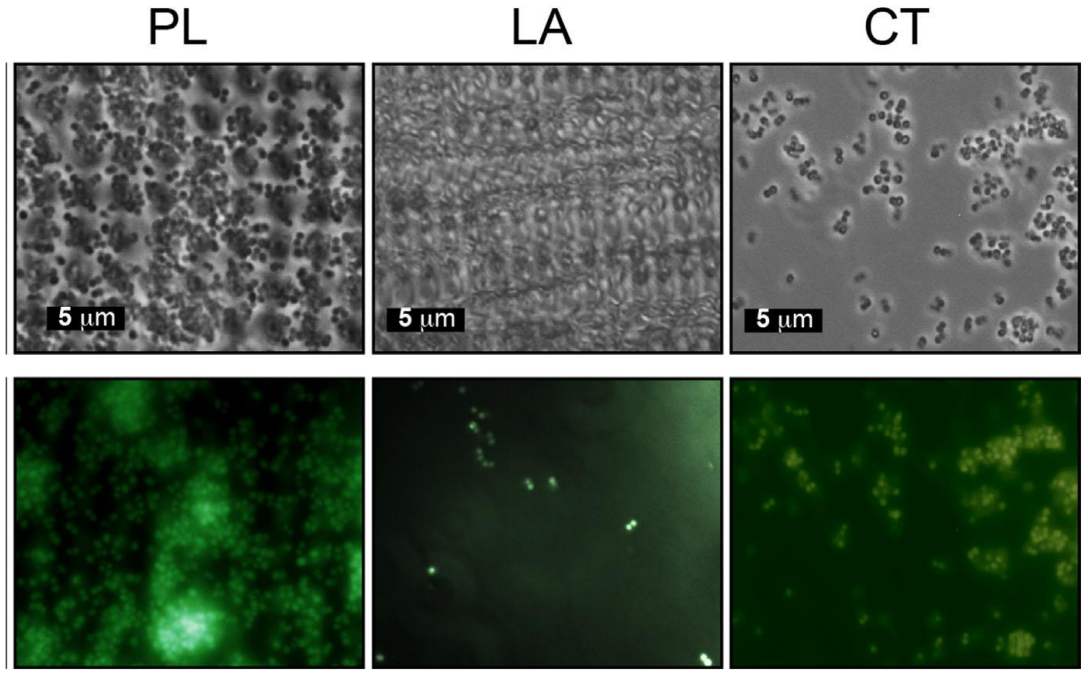
PHOTONICS PUBLIC PRIVATE PARTNERSHIP

Fabrication of antibacterial surfaces

Example of surface functionalization using DLIP on dental implants



Fabrication of DLIP structure (~ 5 µm) “decorated” by LIPSS (~150 and 800 nm) into DLW features (~ 50 µm)



Impressive reduction of bacteria adhesion by producing period patterns using DLIP

Multifunctional surfaces

- Antibacterial
- Biocompatibles
- Wear reduction

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 825132.
It is an initiative of the Photonics Public Private Partnership (**www.photonics21.org**).

PHOTONICS PUBLIC PRIVATE PARTNERSHIP

Project Partners

TECHNISCHE UNIVERSITÄT DRESDEN

next scan technology

TRUMPF

BOSCH

EPIC European Photonics Industry Consortium

NIT New Infrared Technologies

B/S/H/

lasea PRECISION LASER SOLUTIONS

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825132.
It is an initiative of the Photonics Public Private Partnership (**www.photonics21.org**).

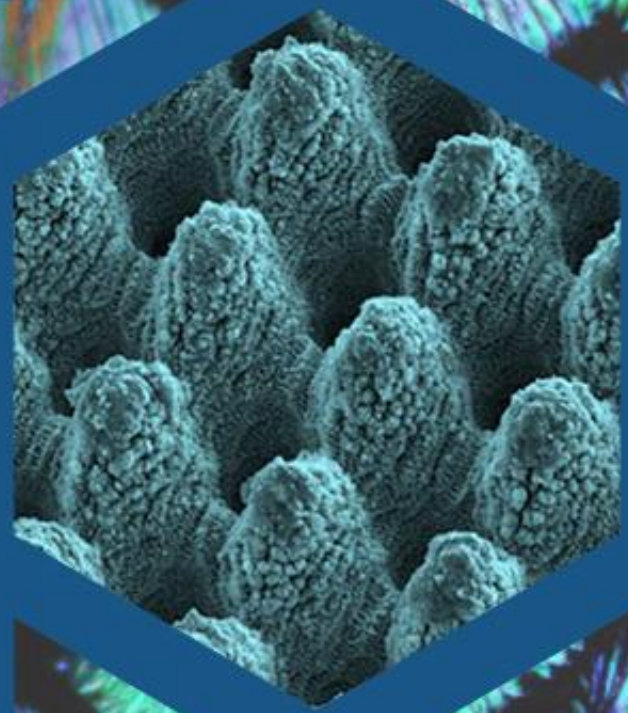
PHOTONICS21 PHOTONICS PUBLIC PRIVATE PARTNERSHIP

LAMPAS

FUNDED BY

PHOTONICS 21

PHOTONICS PUBLIC PRIVATE PARTNERSHIP



www.lampas.eu

info@lampas.eu

lampas-eu-project

lampaseuH2020

Thank you for your attention

Prof. Dr. Andrés F. Lasagni

Technische Universität Dresden
01062 Dresden, Germany
Fraunhofer IWS, Dresden

andres_fabian.lasagni@tu-dresden.de

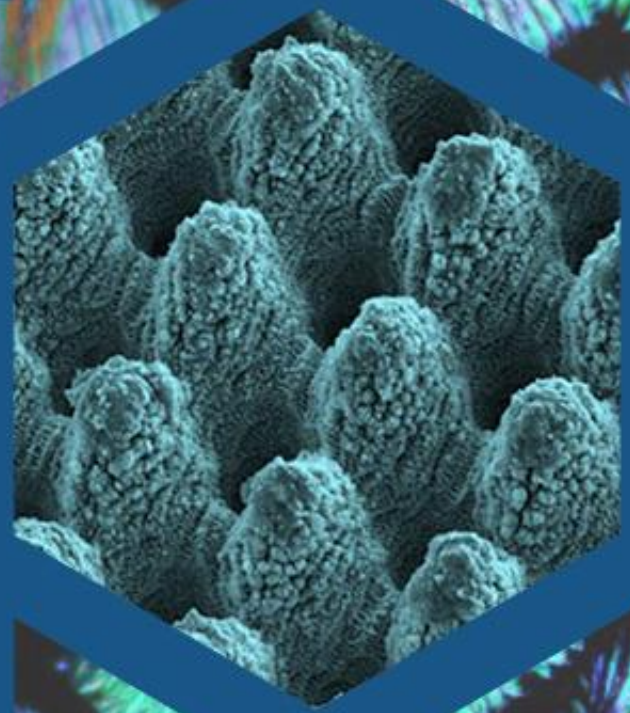
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825132. It is an initiative of the Photonics Public Private Partnership (**www.photonics21.org**).

LAMPAS

FUNDED BY

PHOTONICS21

PHOTONICS PUBLIC PRIVATE PARTNERSHIP



www.lampas.eu

info@lampas.eu

lampas-eu-project

lampaseuH2020

TECHNISCHE UNIVERSITÄT DRESDEN

next scan technology

TRUMPF

BOSCH

EPIC European Photonics Industry Consortium

NIT New Infrared Technologies

B/S/H/

lasea PRECISION LASER SOLUTIONS

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825132. It is an initiative of the Photonics Public Private Partnership (**www.photonics21.org**).