FABULOUS

FABrication of 3D metasurfaces to enable the next generation of high efficiency optical products

FABULOUS - Enabling the next generation of high efficiency optical products on 3D surfaces through Two Photon Polymerization

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Project summary

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The FABulous project is developing a manufacturing platform designed for high-throughput, high-resolution, large-scale fabrication of optical metasurfaces. Our vision is that the platform will be able to economically produce 3D structured metasurfaces on products with non-planar surface topologies with high efficiency.

What is a metasurface?

engineered thin layers that manipulate the behaviour of light in a variety of ways. They consist of subwavelength-sized structures arranged over the surface that have been carefully designed to interact with light in a precise manner.

FABulous methodology

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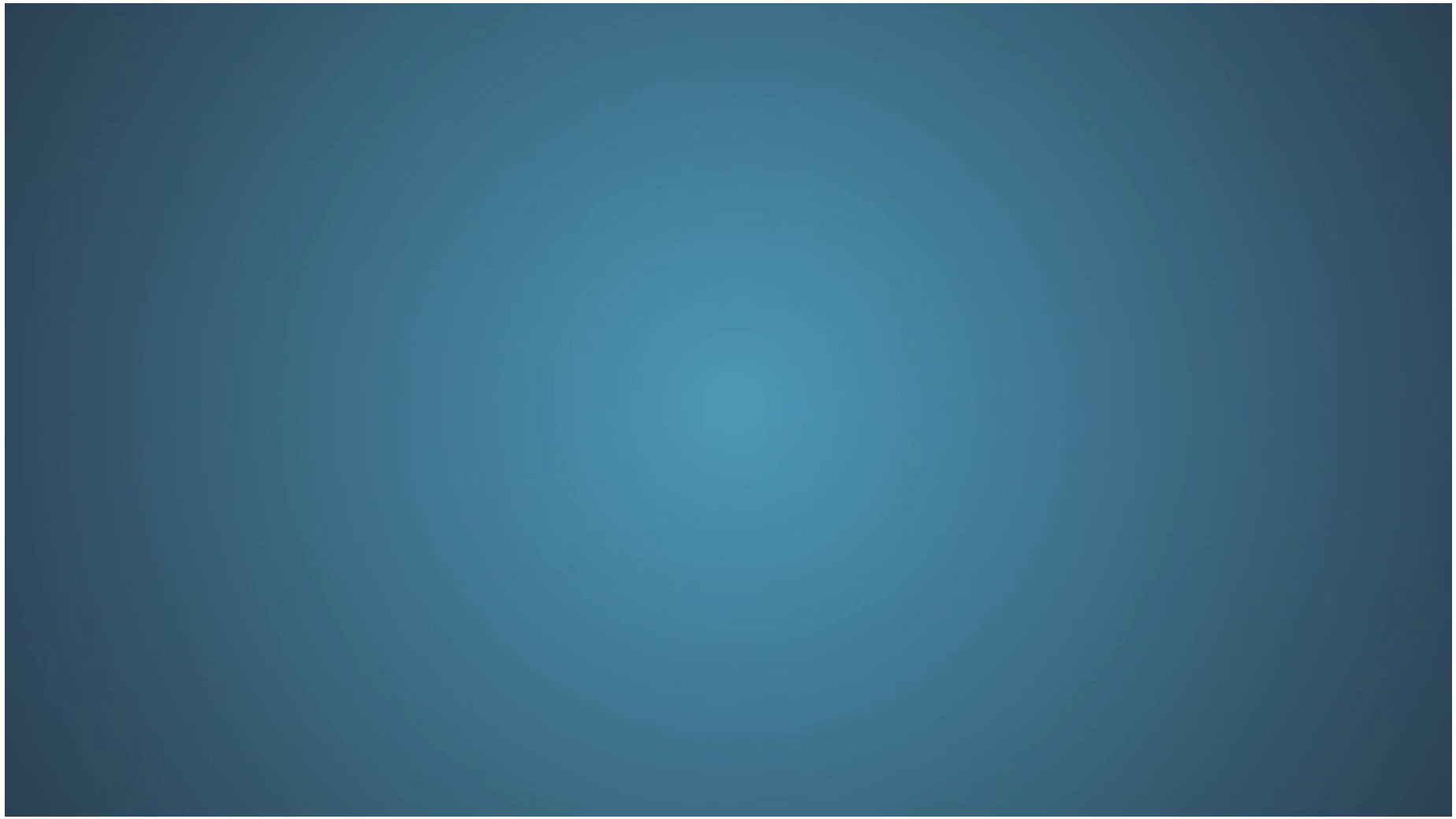

FABulous methodology

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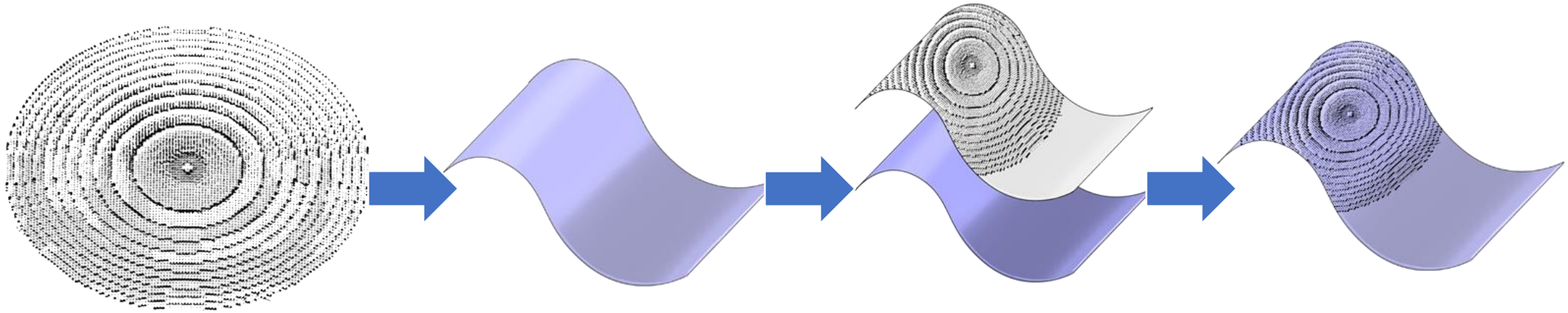
Process flow for the structuring of nonplanar structures



Input: Metasurface designs meeting end user requirements

Measurement and treatment of nonplanar substrates

Adapt design to topography and process preparation

Parallelized fabrication of 3D metasurfaces

FABulous design

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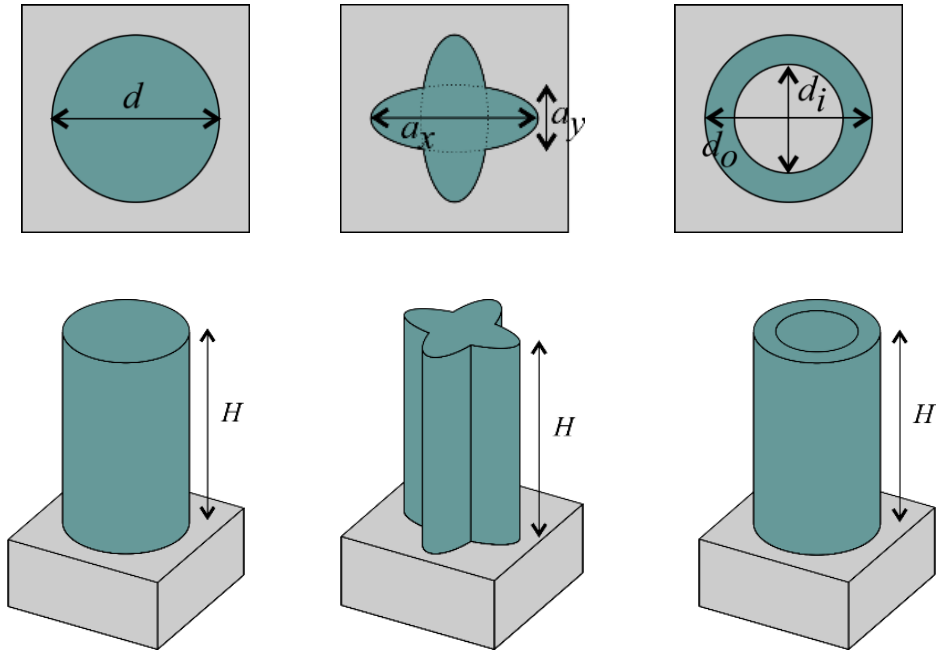
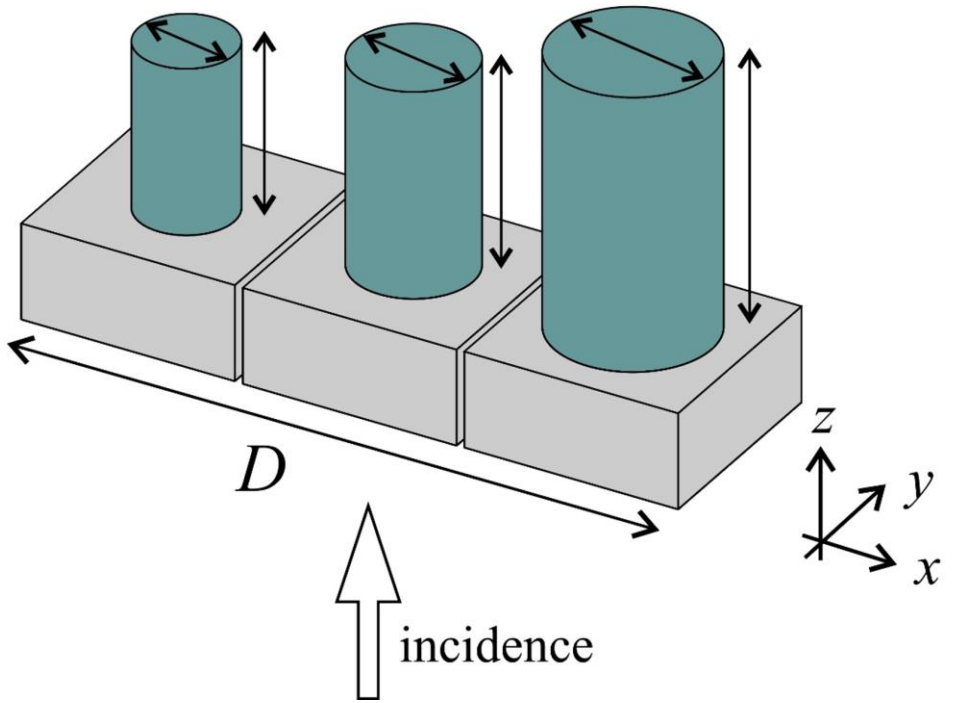
Examples of meta-atom geometries



Examples of meta-atom distributions



FABulous manufacturing

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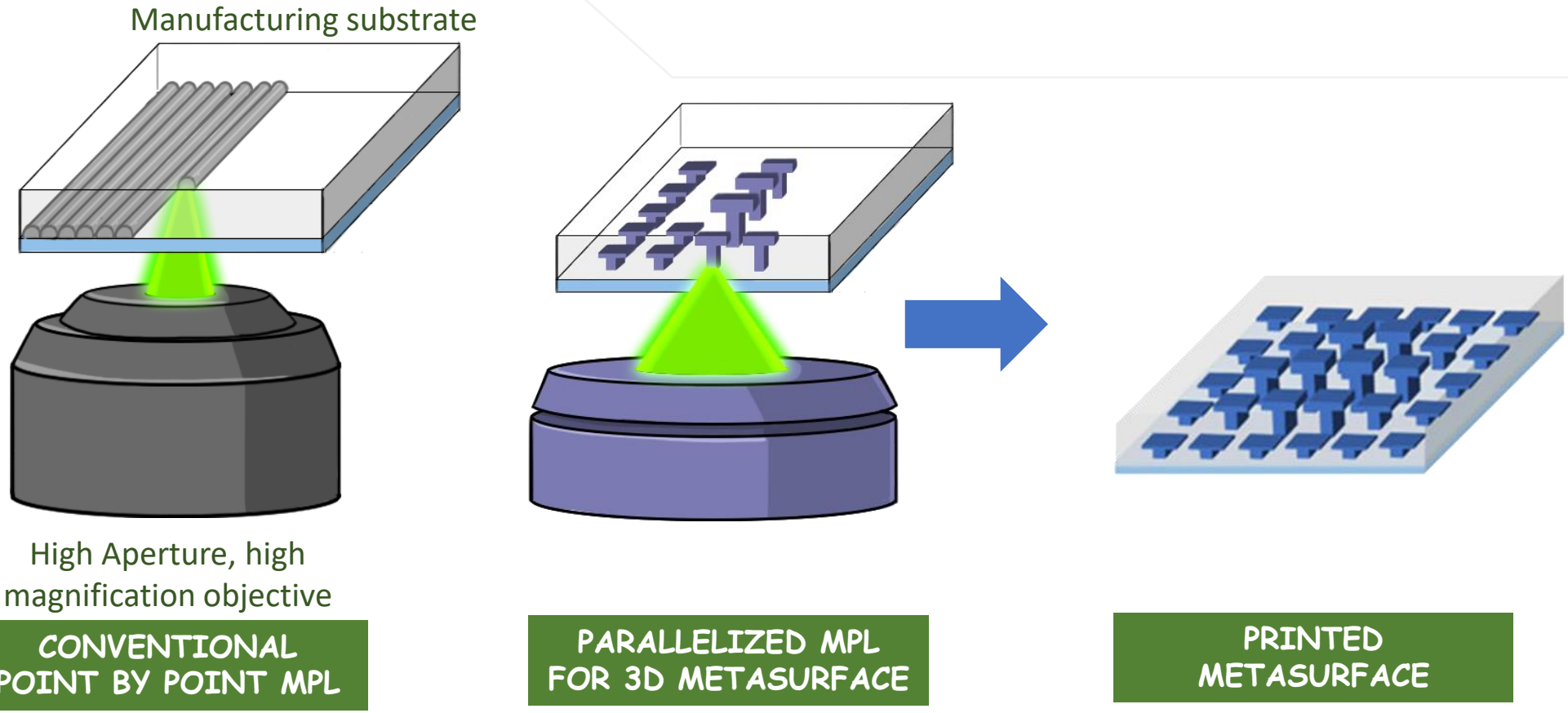
A new industrial surface 'coating' technology for manufacturing high resolution 3D metasurfaces at a throughput viable for series production



FABulous manufacturing

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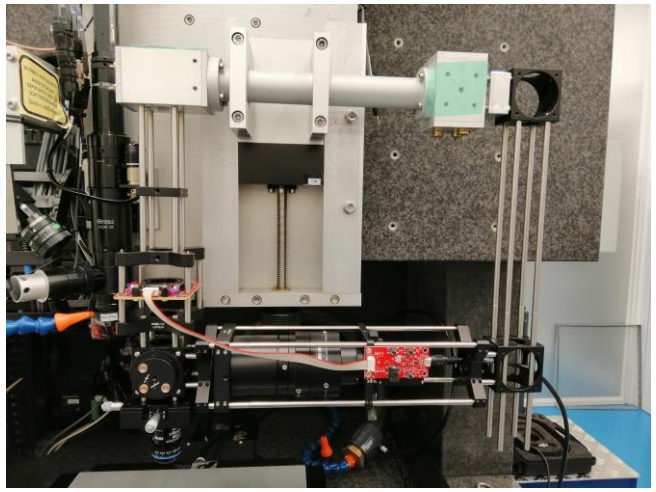
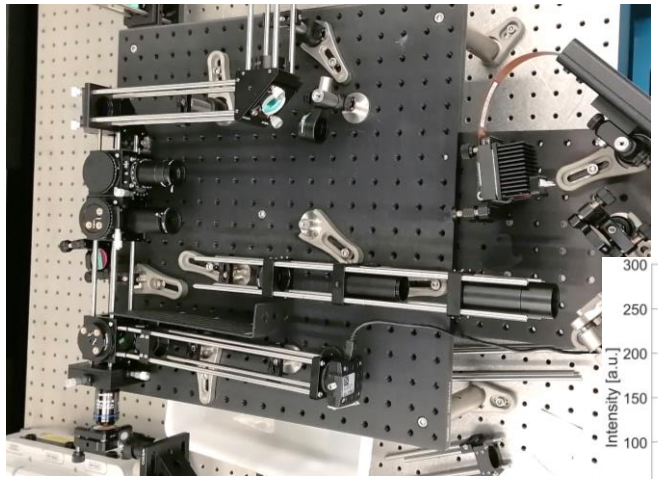
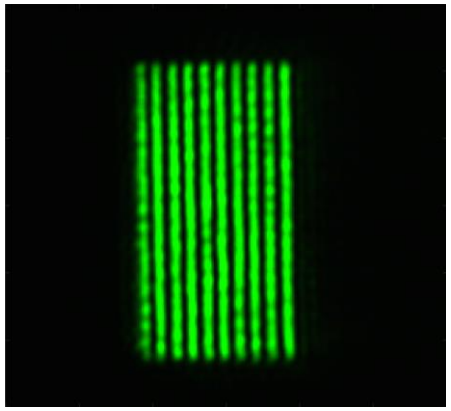
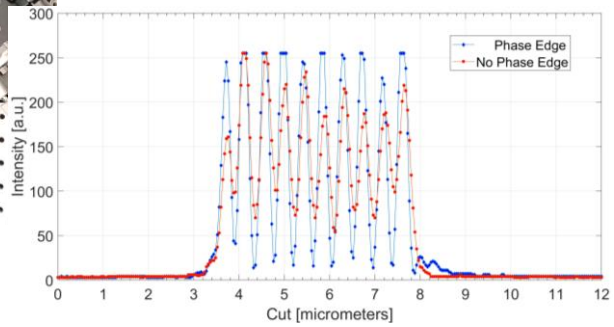
From experimental setups…

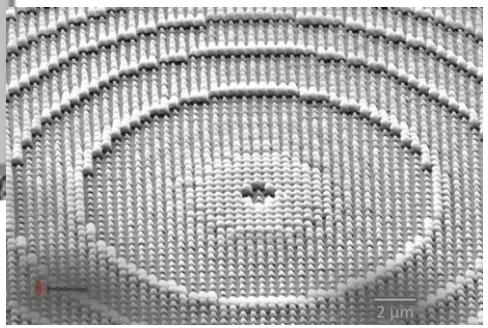






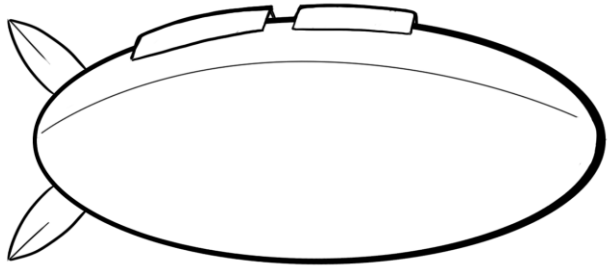


to industrial machines



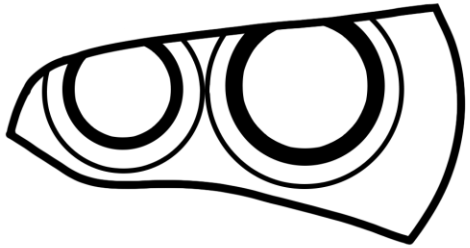
FABulous applications

The Fabulous technology delivers an innovative high-efficiency manufacturing solution that will enable Europe's lead in industrial decarbonisation through the demonstration of sustainable manufacturing with reduced energy and resource consumption and increased productivity in three complementary use cases:



Manufacturing high efficiency solar cells for high altitude platforms

Reducing the size and weight of automotive camera lenses



Manufacturing high efficiency light pipes used in automotive lighting systems

Final remarks

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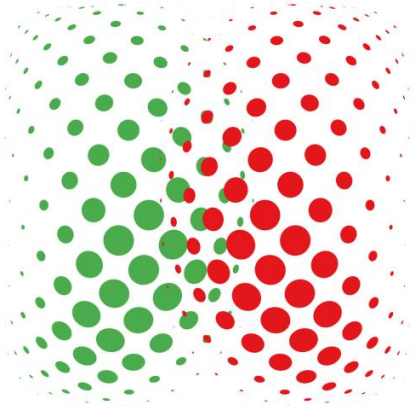
- Fabulous is a complete manufacturing platform involving developments in:
  - Design,
  - Simulation,
  - Manufacturing.
- Client oriented design.
- Unprecedent resolutions in 3D fabrication that allow the realization of those designs.
- Sustainable manufacturing with reduced energy and resource consumption and increased productivity
- Direct transfer of technical partners knowhow to industrial partners.

Thanks for your attention



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