



# PULSE

# The PULSE Project

## High-Power Ultrafast LaSers Using Tapered Double-Clad Fiber

Get in touch...

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 PULSE Project

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PHOTONICS PUBLIC PRIVATE PARTNERSHIP

# The PULSE Project

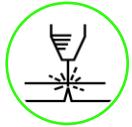
## High-Power Ultrafast LaSers Using Tapered Double-Clad Fibre

The EU-funded PULSE project brings 13 partners across Europe together for one mission - enabling the shift to an advanced manufacturing industry by developing a high-power pulsed laser system.

Europe is the world leader in laser technology, and maintaining this lead is important. To do this, new materials processing technologies must be developed at a competitive cost - and PULSE intends to provide this.

### Our main topics:

Ultra-Hard  
Materials Cutting



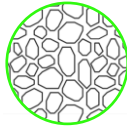
Automotive Boron  
Steel Cutting



Welding of  
Dissimilar Materials



Laser Surface  
Texturing



**"This is a truly innovative project with genuine prospects to revolutionise laser-based digital manufacturing and real huge economic benefits for Europe."**

*-Dr Regina Gumenyuk  
Project Co-ordinator.*

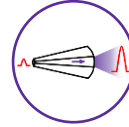
PULSE aims to develop a complete laser system with the ability to cut even the hardest steel used in car construction, texture material at unimaginable speeds and weld dissimilar materials. This will result in reduced waste and energy consumption, impacting positively on both the economy and environment in parallel.



## How will we do it?

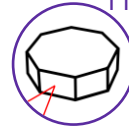
Using state-of-the-art techniques, we aim to build an ultra-high power 2.5kW laser system providing ultrashort pulses down to femtosecond range with repetition rates up to 1GHz.

### Tapered Fibre Amplifiers



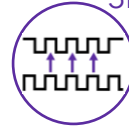
- High immunity to nonlinear effects
- Large mode diameter
- Pure single mode operation
- Low cost production

### High-power Polygon Scanner technology



- Extreme high-power operation
- Ultra-high speed of up to 1.5 km/s
- Precise control of the processing

### 3D Nano-Imprint Lithography



- Complex geometry directly on top of the fibre
- High-power resistant materials
- Beam tailoring optics

### High Purity Glass Material



- Single mode delivery fibre
- Extreme high peak power damage threshold
- High beam quality, immunity to bending

### Fully Integrated Laser-Machining System



- Full integration of the above components
- Fully developed software and algorithms for machine control
- Precise positioning of the scanner head relative to the workpiece

The laser is only part of the story, with additional technological advances being established by the consortium enabling the laser to travel at over 5,000km per hour over a material surface, allowing for faster manufacturing processes.

This technology will revolutionise the manufacturing industry whilst maintaining Europe's rightful place at the apex of laser technology.