

# OVERVIEW OF HILASE OPEN ACCESS FACILITIES

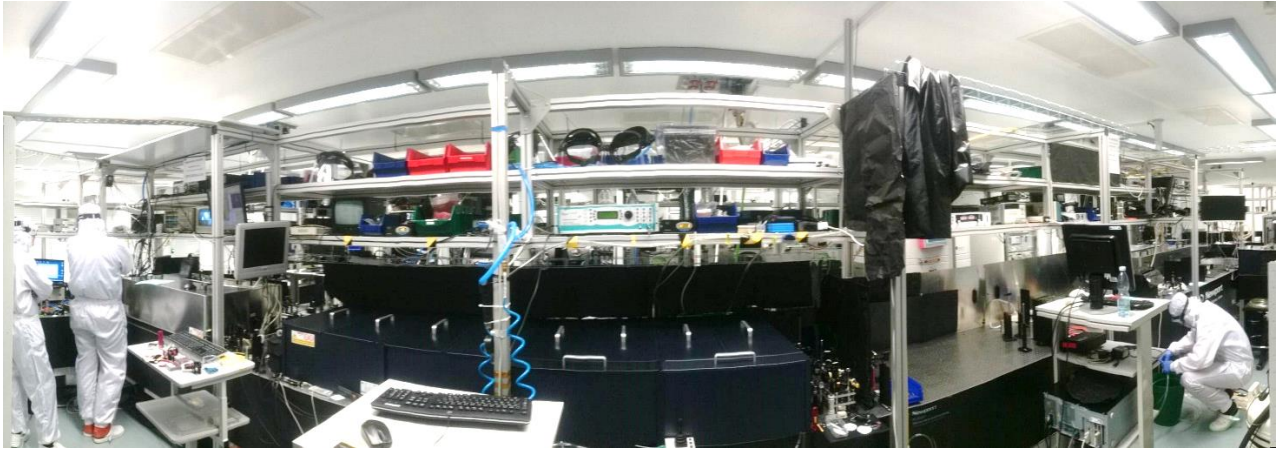
Hilase centre will offer open access to the following lasers and target areas:

## HIGH ENERGY NANOSECOND BIVOX LASER



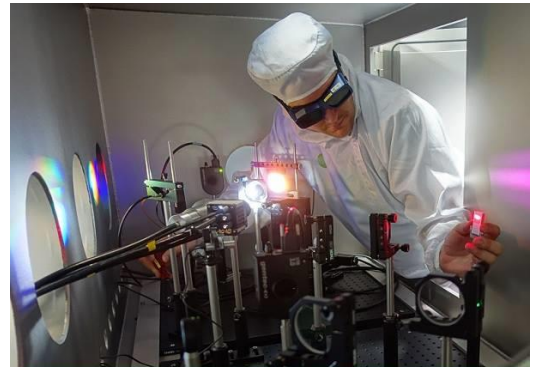
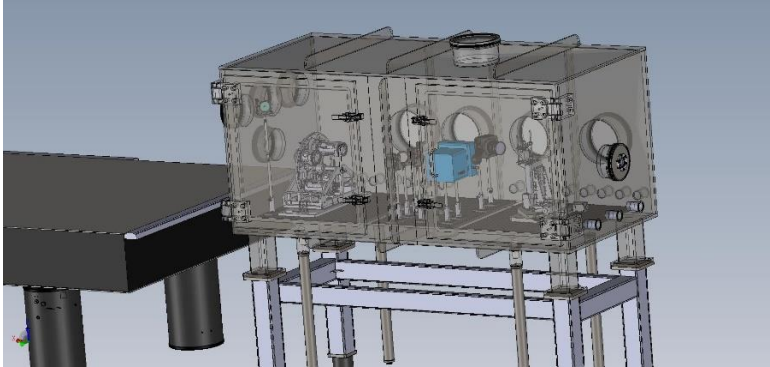
- Repetition rate: 1 Hz and 10 Hz
- Pulse length: 10 ns & 5 ns
- Energy: 5.5 J and ~ 5.0 J on LSP/LIDT stations @ 10 ns, 4.2 J and ~ 3.8 J on LSP/LIDT stations @ 5 ns
- Beam dimensions: 22 mm x 22 mm (square)
- Wavelength: 1030 nm
- Polarization: linearly polarized
- Availability: 11 am - 6 pm
- Pulse to pulse energy stability: 3%

## HIGH REPETITION RATE PICOSECOND PERLA C



- Repetition rate: 50 kHz or 100 kHz (now optimized for 50 kHz)
- Pulse length: 1.5 ps up to 100 W (6 ps at 250 W)
- Energy: 5 mJ in compressed pulse (50 kHz)
- Beam diameter: approx. 4 mm (it can be modified)
- Wavelength: 1030 nm + 515 nm (up to 30 W/100 kHz/1 ps) + 257.5 nm (up to 4-5 W/100 kHz/1 ps)
- Polarization: linear
- Availability: 8 hours/day
- Long-term power stability: <1.2 % RMS over 6 hours
- Beam quality:  $M2 = 1.4 - 1.8$ , depending on output power

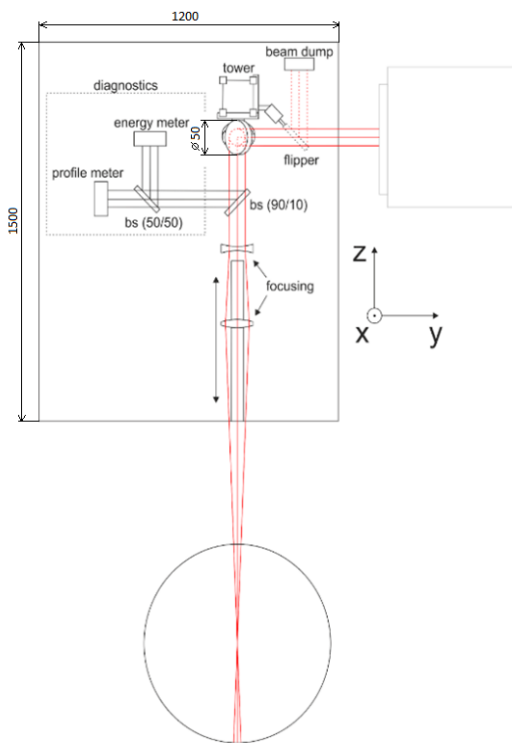
## LASER INDUCED DAMAGE THRESHOLD (LIDT) TARGET AREA



- ISO LIDT tests 1-on-1, s-on-1 type 1 and 2, r-on-1
- ISO 7 clean room environment
- Samples size up to 100x100x100 mm (it can be increased in special cases)
- Samples weight up to 1,5 kg
- Angle of incidence 0° to 60°
- Laser at 1030 nm, 10 Hz, 10 ns, up to 5 J
- Variable spot size
- Online fast camera 1000 fps
- Post-test analysis with laser scanning microscope

# LASER SHOCK PEENING (LSP) TARGET AREA

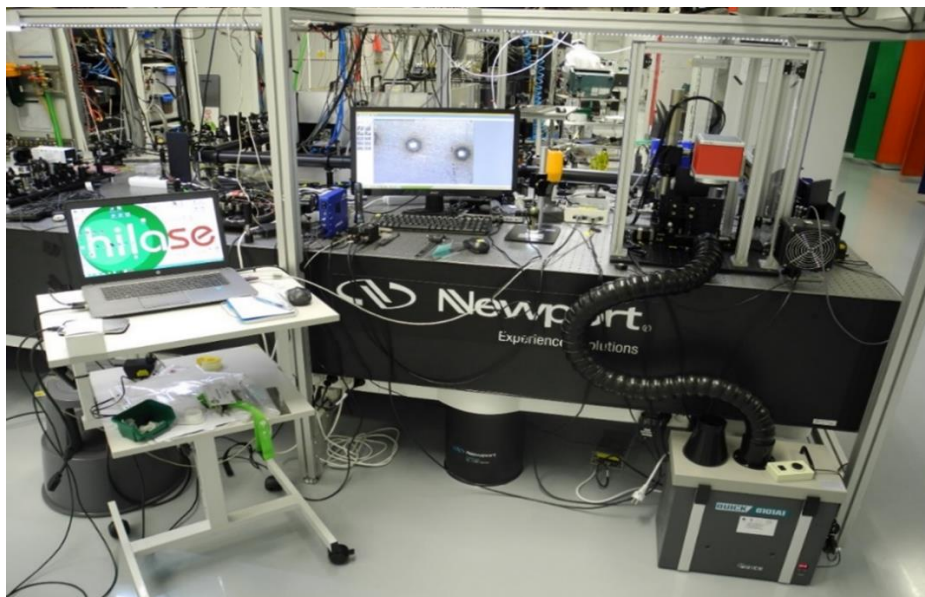
## 1) Laser Shock Peening (LSP) target area



- Load capacity: 20 kg (special cases up to 300 kg)
- Max. workpiece size: 1 m
- Experience with these materials: Titanium alloys, stainless steel, aluminum alloys
- Beam size: up to 3 mm x 3 mm
- Productivity: up to 200 cm<sup>2</sup>/hour
- Results: uniform strengthening of the surface layer up to depth of 1 mm, extension of the lifetime of the component
- Testing methods: residual stress measurement by X-Ray diffraction and hole drilling (ASTM standard E 837), measurement of fatigue strength and material lifetime

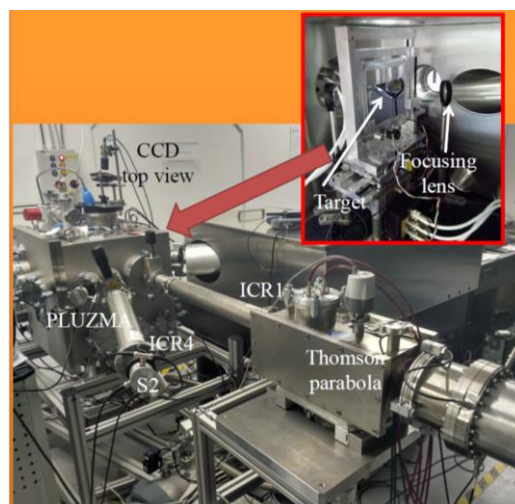
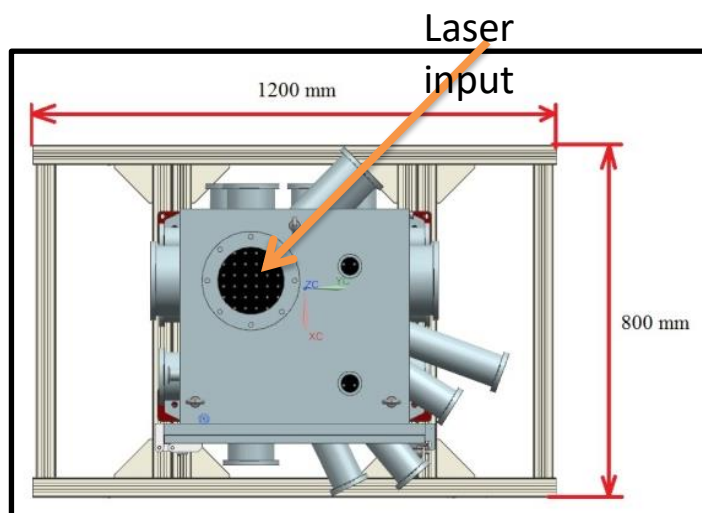


## LASER MICRO-MACHINING TARGET AREA WITH PERLA C

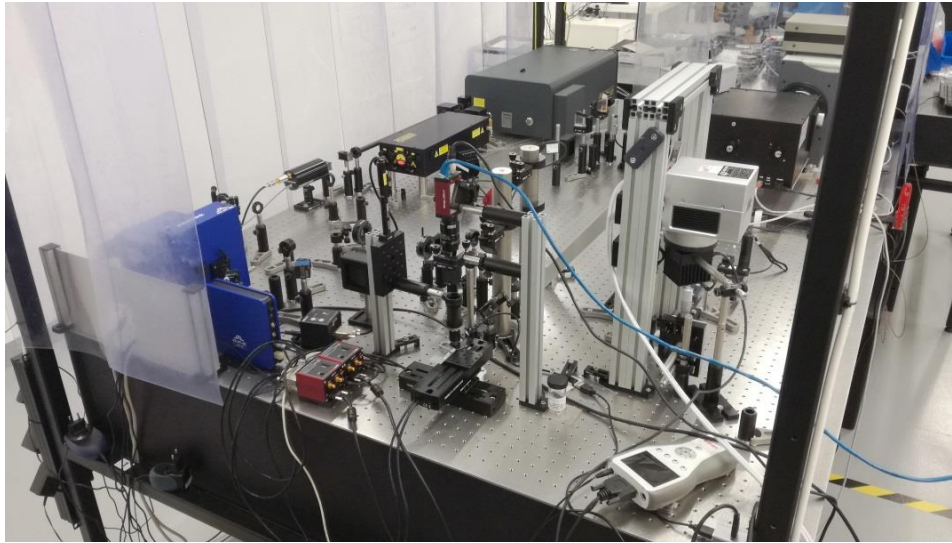


- Position precision : up to 2 microns
- High precision and sharp edges

## LASER ION GENERATION TARGET AREA (SHARED WITH ELI)



- 10 cm focusing lens
- Top view CCD camera
- Thomson Parabola
- TOF detectors at different angles and distances



### Pharos

- Repetition rate: 1 Hz – 200 kHz, burst mode is possible
- Pulse length: 270 – 6000 fs
- Maximal power: 3 W
- Maximal pulse energy: 1 mJ
- Wavelength: 1030 nm
- Harmonic frequency: 2<sup>nd</sup> at 515 nm (~ 0.5 mJ @ 2 kHz)
- $M^2$ : < 1.2
- Polarization: linear

### Galvanoscanner

- Wavelengths: 1030 nm, 515 nm
- Maximal scan speed: 2 m/s
- Spot size: ~ 25  $\mu$ m
- Working distance: 13 cm
- Sample size: 12 x 12 mm (100 x 100 mm)