Specifications

Ablation Laser

Wavelength (*)	355 nm	532 nm
Pulse duration	400 ps	550 ps
Repetition rate	20 000 Hz	
Pulse energy	1 µJ	3.5 µJ
Peak power	2 kW	6 kW
Laser class	3B	

* Other wavelength on request

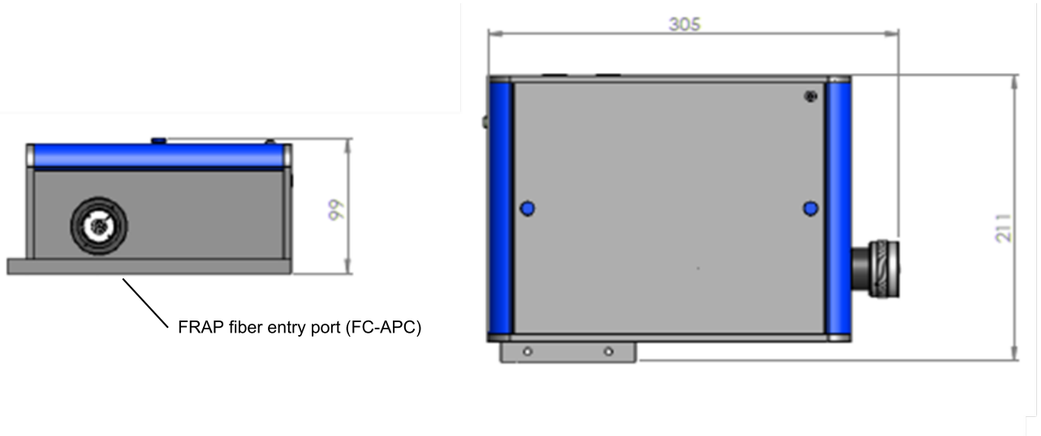
Optical

Wavelength range	350-650 nm	
Compatibility	Illumination port - Main microscope companies	
Objectives	UV compatible	

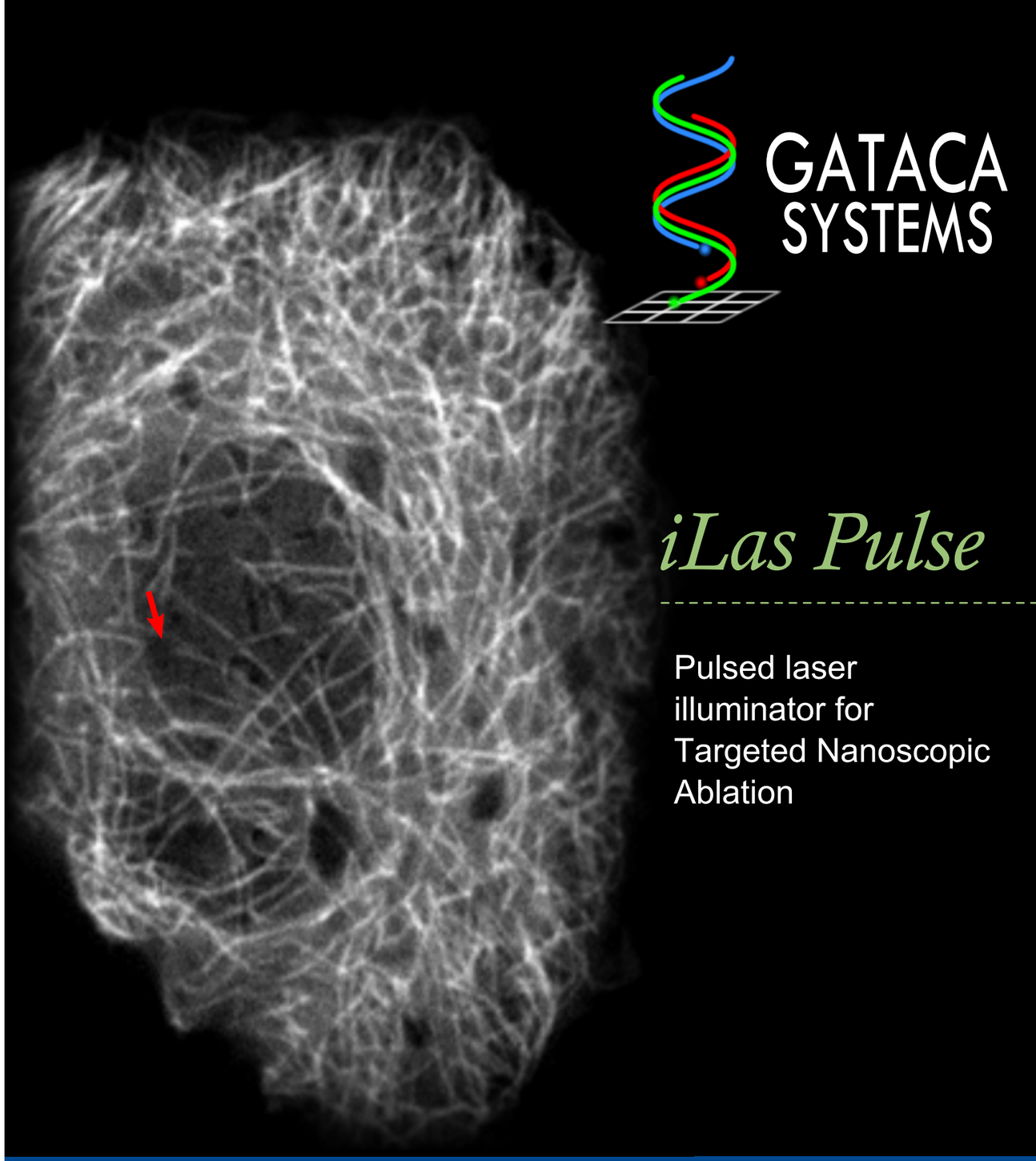
Control

Wavelength range	350-650 nm
Intensity modulation	0 to 100% (200 steps)
Modulation bandwidth	20 000 Hz
Response time	20 µs
Scanning speed	20 000 Hz
External trigger	yes

Dimensions (mm)



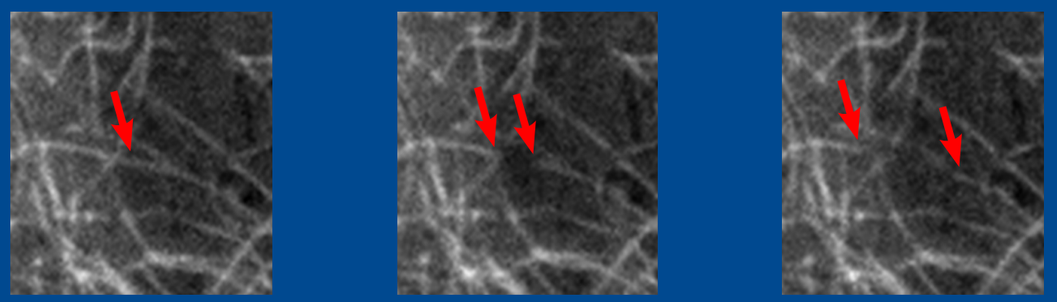
For more information on iLas Pulse :
Gataca systems
21/23 rue Aristide Briand
92170 Vanves, France
Tel: +33 141906740



GATACA SYSTEMS

iLas Pulse

Pulsed laser illuminator for Targeted Nanoscopic Ablation

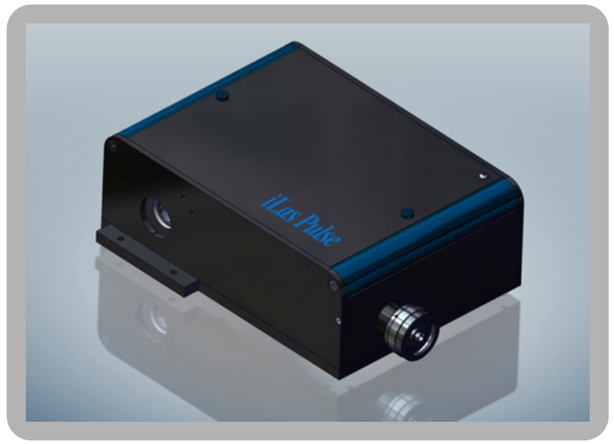


The iLas Pulse system is a unique tool for Subcellular Nano-surgery and Nano-irradiation combined with FRAP/Photoactivation. Coupled to a microscope, it addresses a wide variety of bio-physical applications.

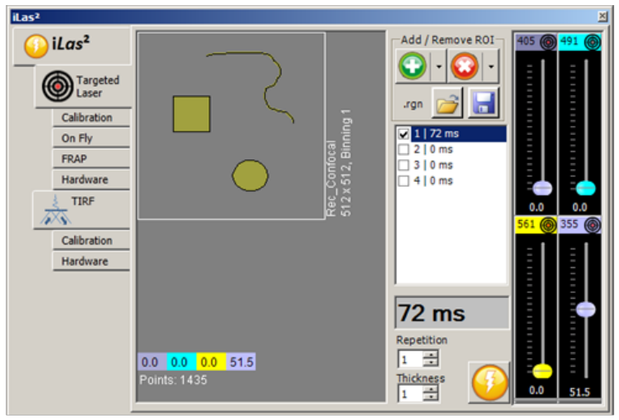
Precise focusing of pulsed laser light in real time enables non-invasive manipulation of the structural machinery of living cells with several-hundred-nanometer resolution.

Features

- Non-invasive manipulation and processing at cellular and subcellular scale
- Dissection, removal, disruption of submicrometer objects without altering neighboring strutures or compromising cell viability
- Easy combination with FRAP, Photoactivation via fiber entry port.
- Superimpose all optical paths. Operates without commutation delays
- Compatibility with spinning disk confocal systems
- Live targeting



iLas Pulse includes an optical head containing a pulse laser and scanners, associated electronics and a software module. It uses illumination light paths of conventional research microscopes.



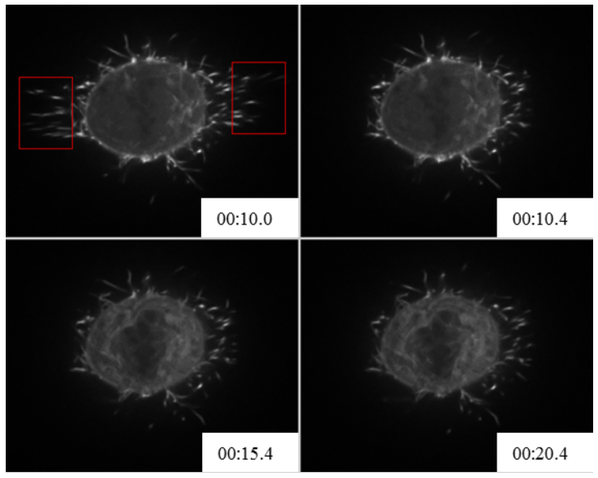
The iLas Pulse system provides an easy-to use interface to manage the lasers, set-up ROIs and plan the experiment. In order to lighten the acquisition process and enhance steering speed, iLas Pulse is driven by its own electronics.The fastest phenomena can be measured since no mechanical parts move during acquisition due to the vectorial scanning method.
The iLas Pulse system can interactively target ROI while displaying a Live image and to record pre- and post-laser action at very highspeed. The user can remove fast-moving structures and analyze effect as the cell or tissue continues living.

- Targets 20000 laser positions per second in vectorial control mode
- Acousto-optic high bandwidth modulation
- Diffraction-limited laser spot with accurate 3-D targetting capabilities
- Auto-calibration function
- Built-in interactive help

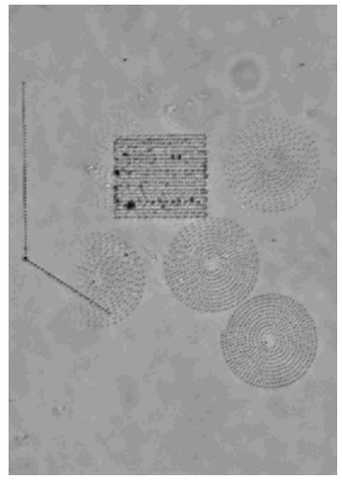
Applications

- Sub-cellular cutting and ablation (cytoskeletal filament, chromosome...)
- Organelle destruction (mitochondria, vesicles…)
- Full or partial cell disruption (Axotomy…)
- DNA irradiation (DNA repair mechanism…)
- Microstrokes (Thrombosis…)
- Embryo development alteration (Cell lineage study…)
- Molecular uncaging and invivo photochemistry
- Single cell optical transfection
- Nano-patterning (adhesion pattern modification…)
- Micro-fabrication (photonic and electronic microscopy registration…)

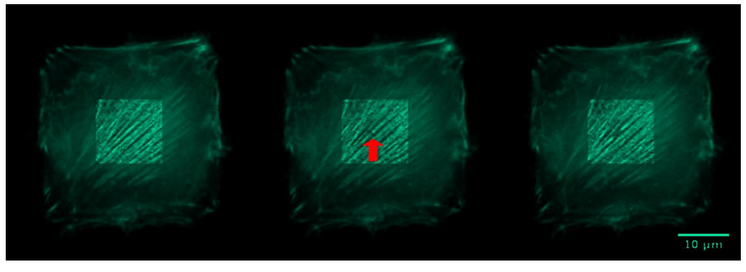
➤ All these applications can be combined with FRAP/Photoactivation/Optogenetics



Cells transfected with Lifeact-mCherry in which areas of actin filaments are disrupted during mitosis before chromosome segregation, using laser ablation at 355nm over the red rectangles for 0.4s. Fink et al., Nature Cell Biology.



When the laser is set at a high power it is possible to engrave plastic or glass surfaces in order to micropattern cell substrate or to create in-depth registration marks.



RPE1 cells, transfected with lifeact-GFP, Dr Timothée Vignaud, Dr Laurent Blanchoin team at CEA Grenoble, France. Laser ablation at 355nm permits visualization of relaxation of a single actin stress fiber after targeted ablation. Central part of the images was enhanced for better visualization.

Front page legend:
Hela cells transfected with GFP-tubulin. The laser nano-ablation @355nm has been done in live stream mode at 10 fps with 100ms exposure time. The arrows point the minus-end behavior following the ablation. Several microtubules were cut during the same acquisition without compromising cell viability.
Dr. Ilya Grigoriev, Dept. of Cell Biology, Erasmus MC, Rotterdam, the Netherlands. Images made in PICT-IBiSA-Institut Curie, Paris.

www.gataca-systems.com