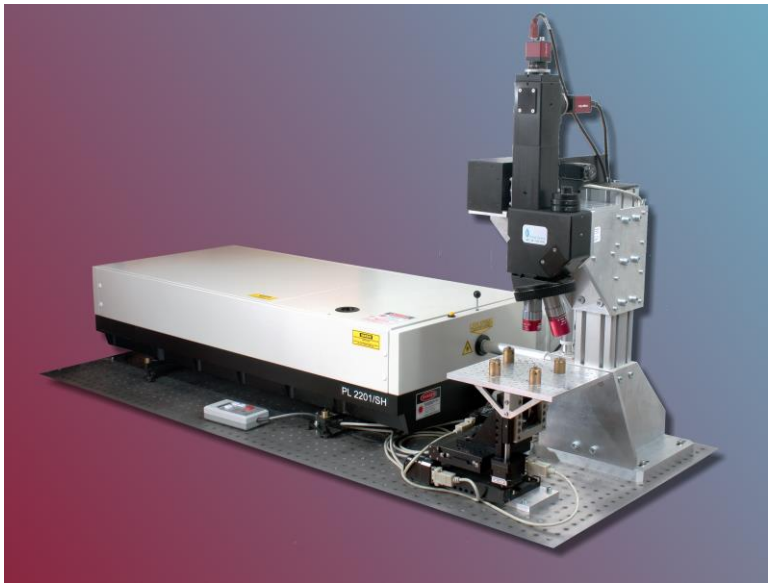

PLSS
series

Picosecond Laser Simulation System
PLSS-3

PLSS-3 Laser Simulation System is intended for single event effects (SEE) investigations in integrated circuits (ICs) and semiconductor devices (SDs). By varying pulse energy, picosecond laser allows to simulate ionization tracks produced by particles with various linear energy transfer (LET).

PLSS-3 includes picosecond diode-pumped solid state (DPSS) laser source, high precision computer controlled XYZ translation stage and specialized industrial high-resolution microscope. Laser source can produce a train of pulses with 1064/532 nm wavelengths at a max. 1000 Hz repetition rate or operate in a single-shot mode. These two wavelengths are generally used to simulate the effects produced by particles with different penetration depths.

Laser pulses are focused through a microscope onto the device under test (DUT). The microscope has two visualization channels equipped with two high resolution VIS and NIR cameras, showing the position of the laser beam for top-side and back-side DUT irradiation correspondingly.

Various Mitutoyo® high resolution objectives with large working distance (having magnifications between 5× and 100×) can be used, and the spot size of the incident laser beam on DUT surface can be varied between approximately 2 and 200 microns.

Devices are scanned under the laser beam to locate sensitive nodes. High-speed digital oscilloscopes, transient digitizers and logic analyzers (optional) capture the response of devices to charges generated in the semiconductor material by the incident laser pulse. The thresholds for SEE can be determined using focused and local laser irradiation technique

Features

- Picosecond DPSS laser source
- 1064/532 nm wavelengths available
- 1000 Hz laser pulse repetition rate and single-shot mode
- High precision object scanning system
- High-resolution Mitutoyo® objectives with extra large working distance
- Two high-resolution VIS and NIR cameras for top-side and back-side visualization
- Accurate synchronization of scanning, irradiation and electrical response registration
- Compact design on 1500×700 mm breadboard
- Fully controlled by PC software
- Low maintenance cost

Applications

- Investigation of:
  - single event upsets (SEU)
  - single event latchup (SEL)
  - single event transients (SET)
- Validating of radiation-hardening techniques
- Testing of radiation hardened designs
- Finding of the most radiation sensitive IC area and operation mode
- Debugging technique for IC testing under ion beam
- On-PCB ICs testing
- Investigation of destructive failures in ICs due to SEL
- Micromachining

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Specifications

Parameter	Unit	Value
Laser source type	–	DPSS Nd^{3+}:YAG
Wavelengths	nm	1064/532
Max. laser pulse energy on DUT	μJ	8/3
Laser pulse duration (FWHM)	ps	70 (30 is also available)
Laser pulse energy stability	%	± 3
Min. laser spot size ($1/e^2$) (for 20× objective)	μm	2.4/1.4
Laser pulse energy attenuation coefficient	–	1 … $5 \cdot 10^4$, PC controlled
Pulse repetition rate	Hz	0…1000
Video camera VIS (NIR):		
Type	–	Color CCD progressive (CMOS progressive)
Resolution	pixels	1392×1040 (1280×1024)
Max frame rate at full resolution	Hz	17 (25)
Spatial resolution	μm/pix.	0.3 (for 20× objective)
Interface type	–	IEEE 1394a
Standard set of objectives (may vary upon request):		
Type		Mitutoyo Plan APO NIR
Magnification: 5×	pcs.	1
20×	pcs.	1
Device positioning system:		
XYZ stage	–	motorized, PC controlled
Min. step (horizontal; vertical)	μm	0.156; 0.125
Travel range (horizontal; vertical)	mm	100; 25
Max. linear speed	μm/s	500
Special mounting / alignment constraints:		
Max. device/PCB size	mm	400
Objective working distance	mm	20 (for 20× objective)
Cooling	–	Air convection
Total dimensions (excl. power supply)	mm	1500×600×870
Power supply:		
Mains type	–	~ 220 V, 50 Hz
Max. power consumption (not incl. PC)	kW	< 1
Dimensions	mm	365×320×160
PC software interface	–	English

NOTE: All specifications are subject to change without notice

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