

LIBS Sci-Trace

Sci-Trace is a laboratory LIBS research setup consisting of an instrumentation cabinet and the LIBS Interaction Chamber mounted on an optical breadboard.

Cabinet provides space for multiple shelves with LIBS instrumentation (laser head, spectrometers, power meters, calibration lamps, etc.) and rack-compatible components (control electronics, PC, laser PSU etc.).

Configurable spectroscopic system

Possibility of selecting desired combination of the interaction chamber, laser, detection system, specialized module and optomechanical accessories. Mutual compatibility guaranteed.

Plug-in concept

Easy system expansion by the user, wide spectrum of modules: components of the interaction chamber, lasers, spectrometers, detectors, vacuum components etc. The user simply joins the new module into the setup and activates the corresponding software plug-in.

Designed by scientists for scientists

Designed to be opened and ready for various researcher`s extensions and experiments. Allows to fully concentrate on the LIBS method and its results rather than troubleshooting and system building.

Capable and intuitive software

Integrated software for control of all the system elements, spectra capturing and spectra processing with still growing chemometric capabilities.



featuring
LIBS Interaction Chamber

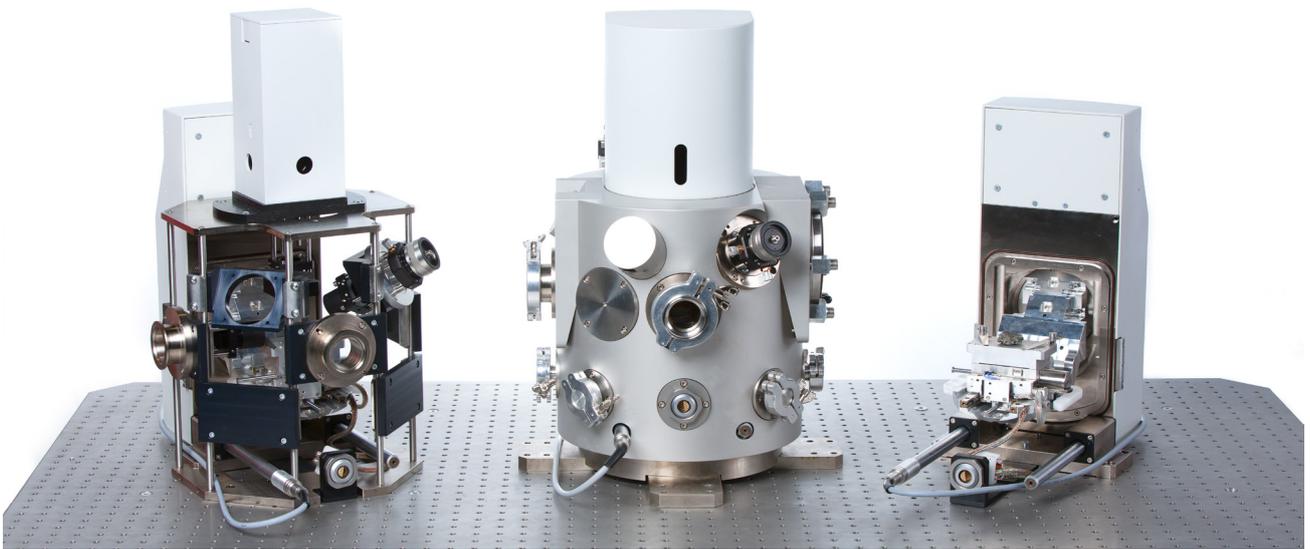
Sample area

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| Manipulator | Motorized manipulator <i>Movement range 40×40×40 mm, 2 μm resolution, High-Vacuum ready, including series of sample holders</i> |
| Interaction chamber | Vacuum LIBS Interaction Chamber <i>Airtight rigid body, 11 input ports aiming to a common center + 4 lateral input ports</i> [alt] Open type - Cage chamber <i>6 mounting ports aiming to a common center</i> [alt] Manipulator stand |
| Top optical breadboard | Anodized Al-alloy board, M6 threaded holes, dimensions: 1304 × 829 × 8 mm <i>Feedthroughs for cable management and laser beam delivery, USB connector panel, possible to mount corner rails for laser filter plates</i> [alt] Imperial threaded holes, magnetic steel board and different board dimensions upon request |

LIBS instruments

[alt] alternative configuration [opt] optional feature

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| Pulsed laser | Lamp-pumped (LPSS) Nd:YAG <i>532nm, 200 mJ, 8 ns, 20 Hz, compact design</i> [alt] Diode-pumped Nd:YAG (DPSS) [opt] Double pulsed feature [opt] Other Nd:YAG wavelengths available (1064nm, 532 nm, 355nm, 266 nm) [opt] Up to 800 mJ at 1064 (FPSS, single-pulsed) |
| Spectrometer | Echelle, 190-1100 nm <i>Focal length 120 nm, f/4, resolving power up to 5000 λ/FWHM</i> [alt] Czerny-Turner, multiple gratings on turret, USB control, multiple output |
| Detector | EMCCD, 180-1100 nm <i>1004 x 1002 px, 20 Hz, min 10 μs exposure time</i> [alt] ICCD detector, 1024 x 1024 px, 180-850 nm, USB [alt] Deep-UV CCD detector (Chamber mounted) |
| Digital Delay Generator | 4 output, 5 ns time resolution [alt] 8 output, 5 ns time resolution |
| Accessories | Calibration lamp - continuous spectrum: Deuterium-Halogen Calibration lamp - line spectrum: Mercury-Argon Guiding laser, DPSS 532 nm, 4 mW Laser safety glasses, 35% visible light transmission, OD 7+ (190-534 nm), OD 6+ (925-1070 nm) |

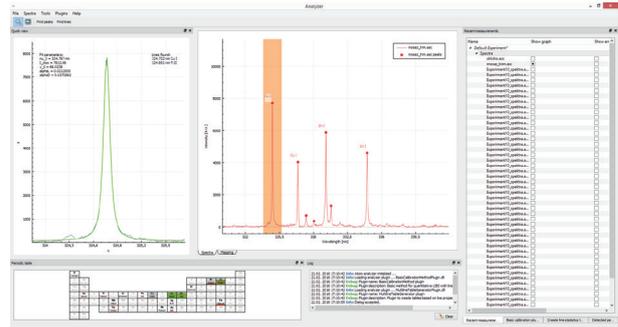


Extension modules

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| Pressure regulating system (PRS) | Setting the pressure in the chamber in the range 1-1300 mbar (a), Ar, He, CO ₂ , etc |
| Gas jet and exhaust module | Cleaning the sample, creating local atmosphere of inert gas, pulse mode |
| Deep-UV CCD detector module | Chamber port-mounted for detecting the emission lines in the region below 200 nm |
| Motorized defocusing module | Chamber internal module for defocusing the laser beam by moving the focusing lens |
| Plasma imaging module | Chamber port-mounted module with triggered CMOS camera (global shutter) |
| Magnetic field module | Chamber internal module for confining the plasma in the magnetic field |
| Liquid LIBS module | Chamber internal module for analyzing the liquids |
| Laser power meter module | Realtime recording the laser energy value |
| Laser attenuator module | Controlling the laser energy while keeping the laser to operate at its most stable output power |

Software capabilities

- Manipulator movement
- Sample view, laser autofocus
- Chemical mapping, depth profiling
- Control of connected LIBS instruments (lasers, detectors, DDGs, etc.)
- Spectra capturing and manipulation
- Identification of emission lines and chemical elements
- Database of elements (spectra captured by LIBS)
- Calculations of plasma parameters (temperature, electron density)
- Creation of calibration curves



Instrumentation cabinet

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| Internal shelf system for LIBS instruments | 2 anodized Al-alloy shelves, M6 threaded holes <i>for mounting the laser head / spektroscope / optomechanics</i> [alt] Other number of shelves upon request |
| Internal rack system for control electronics | 19-inches rack, height 16U <i>Installed control electronics, control PC, laser PSU, DDG, PSR</i> |
| Safety elements | Interlock system on chamber door and cabinet door Laser beam hidden in tubes |
| I/O panel | 2x HDMI (dual monitor support), LAN, GAS inlet, Gas outlet, Vacuum pump output, Mains |
| Control panel | Emergency STOP, key ON/OFF, electronics ON/OFF, PC ON/OFF, USB |
| Housing and construction | Al profile frame covered by steel plates Cooling fans, noise dampening materials 4 doors: 2 for rack system, 2 for shelf system 4 wheels with retractable stands |
| Dimensions & Weight | 1314 × 853 × 1472 mm, 330 kg (in the default configuration) |
| Power requirements | ~230 V, 50 Hz, 16 A |

