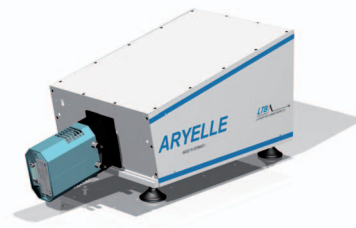


for industrial  
applications in the  
UV-VIS-NIR range

# Spectro meters

Interaction of light and matter –  
induced and analyzed with lasers  
and measuring systems of LTB



	ARYELLE 150*	ARYELLE 200*		ARYELLE 400 / Butterfly*	
Aperture	f/7	f/10		f/10	
Spectral resolution capability $\lambda$ /min. measurable FWHM	5,000 - 11,000	7,000 - 15,000		9,000 - 50,000	
Wavelength range max.	190 - 1,100 nm	175 - 1,100 nm		175 - 1,100 nm	
Simultaneous inspection range	up to 600 nm	up to 600 nm		up to 450 nm	
Standard configuration 16 bit A/D conversion*				UV-versions	
Detector	CCD (12 bit A/D conversion)	CCD	ICCD	CCD	ICCD
Slit width	30 x 30 $\mu$ m	50 x 50 $\mu$ m	50 x 50 $\mu$ m	50 x 50 $\mu$ m	50 x 50 $\mu$ m
Spectral resolving power $\lambda$ /min. measurable FWHM	5,000	9,000	9,000	30,000	14,000
Wavelength range	300 - 862 nm	210 - 800 nm	210 - 800 nm	190 - 330 nm	190 - 330 nm
Resolution FWHM	60 - 172 pm	23 - 90 pm	23 - 90 pm	6 - 11 pm	13 - 24 pm
Gate width	-	-	5 ns	-	5 ns
Step width	-	-	1 ns	-	1 ns
Absolute accuracy	spectral resolution / 4	spectral resolution / 4		spectral resolution / 4	
Dimensions [L x W x H] (Spectrometer without Detector)	(120 x 170 x 86) mm	(260 x 160 x 185) mm		[438 x 200 x 232] mm / [450 x 280 x 240] mm	
Weight (Spectrometer without Detector)	2 kg	7.3 kg		12 kg / 20 kg	

**Extremely compact and cost-efficient high-resolution spectrometer for the material / elemental analysis in industry by means of LIBS and Raman spectroscopy**

ARYELLE 150 is an inexpensive echelle spectrometer with fibre coupling for different CCD- and EMCCD image detectors. It is characterized by a high sensitivity and a high imaging quality. The dispersion unit with grating and prism can be easily configured for different applications.

Applications:

- Laser-induced breakdown spectroscopy (LIBS)
- Spectroscopic process control
- Raman spectroscopy
- Absorption spectroscopy
- Gas chromatography

**Compact high-resolution spectrometer for the material / elemental analysis in industry by means of LIBS and Raman spectroscopy**

ARYELLE 200 is a compact echelle spectrometer with fibre coupling for different CCD, EM-CCD, ICCD and CMOS image detectors. It is characterized by a high sensitivity and a high imaging quality. The dispersion unit with grating and prism can be easily configured for different applications.

Applications:

- Laser-induced breakdown spectroscopy (LIBS)
- Spectroscopic process control
- Raman spectroscopy
- Absorption spectroscopy

**Powerful high-resolution spectrometer for the material and elemental analysis with LIPS and Raman spectroscopy in industry and science.**

ARYELLE 400 is an echelle spectrometer that can generate spectra of relatively arbitrary dimension with high wavelength stability, spectral resolution and radiation throughput. It is used for the highly resolving spectral measurement of plasma emission lines. The lines can be detected simultaneously within a large spectral wavelength range. LTB also provides complete systems including laser system, beam guidance and sample chamber.

Applications:

- Laser-induced breakdown spectroscopy (LIBS)
- Spectroscopic process control
- Raman spectroscopy
- LIBS-Raman spectroscopy in one instrument

\* Other configurations within the range of a/m values possible

\*\* Spectral gaps within the given range

\*\*\* Depending on the adjusted wavelength

# Spectrometers



DEMON\*



ELIAS\*

f/10  
75,000 - 150,000

f/50  
2.5 million - 10 million

175 - 1,100 nm  
1 - 10 nm

157 - 1,100 nm  
8 - 400 pm

VIS-versions

VIS-versions				I	II	III
CCD	ICCD	CCD	ICCD	CCD	CCD	CCD
50 x 50 µm	50 x 50 µm	25 x 3,000 µm	25 x 3,000 µm	25 x 1,000 µm	25 x 1,000 µm	25 x 1,000 µm
15,000	9,400	75,000	75,000	2,250,000	3,200,000	8,800,000
330 - 850 nm	275 - 750 nm **	190 - 900 nm	190 - 900 nm	190 - 550 nm	190 - 550 nm	190 - 550 nm
22 - 57 pm	29 - 80 pm	2.5 - 12pm	2.5 - 12pm	85 - 240 fm ***	60 - 170 fm ***	22 - 63 fm ***
-	5 ns	-	5 ns	-	-	-
-	1 ns	-	1 ns	-	-	-
		spectral resolution / 4 (750 x 310 x 230) mm		spectral resolution x 4 (1,400 x 310 x 250) mm		
		25 kg		50 kg		

**Very high resolution and optical throughput for the production and quality control of diode and solid state lasers**

DEMON is an echelle spectrometer for the highly resolved spectral measurement of emission and absorption lines from the UV into the NIR range. By applying a CCD/ICCD array detector, the lines and their spectral vicinity within the corresponding inspection range can be recorded simultaneously.

Applications:

- Plasma spectroscopy (ICP, MIP, LIBS)
- Spectrometric process control
- Precise absolute wavelength determination of emission lines
- Manufacturing and quality control of diode and solid-state lasers
- Isotope spectroscopy

**Highest-resolution commercial spectrometer series, for the characterization of lasers in the microlithography**

ELIAS is an echelle spectrometer with an extremely high resolution capability. It is used for the highly resolving spectral measurement of emission and absorption lines, particularly of laser lines. The line profiles can be detected simultaneously within their spectral vicinity with a signal-to-noise ratio of up to 40,000 by means of a CCD. Besides the high-resolution spectral measuring of laser lines, the intensity dynamics of up to 4 orders is of the utmost importance.

Applications:

- Excimer laser lithography
- Measuring of the spectral and temporal stability of diode lasers, solid-state lasers and emission lines of lamps

## LTB Lasertechnik Berlin GmbH

established in 1990, is an innovative developer and manufacturer of short-pulse lasers in the whole optical spectral range, different spectrometers and laser-based measuring technique, marketing its products world-wide.

We provide you:

- Laser sources for the industrial analytics and medical diagnostics
- Highest-resolution spectrometers for the development and production of lasers, esp. diode lasers and laser diodes, and for the laser lithography
- Laser-based measuring technique for the spectroscopic material analysis, process analytics and medical diagnostics (LIF, LIBS and Raman)

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