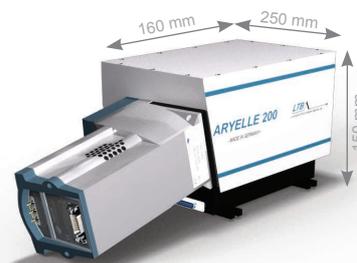


# ARYELLE<sup>200</sup> Spectrometers

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

## ARYELLE 200\* ARraY EchELLE Spectrograph



- Compact and very stable
- High resolution (7,000-15,000)
- Large simultaneous wavelength range
- Can be combined with different detectors (CCD, EMCCD, ICCD, CMOS)
- Up to 30 spectra per second
- Easily configurable dispersion unit

ARYELLE 200 is a compact and inexpensive high-resolution echelle spectrometer for the material/elemental analysis with LIBS and Raman spectroscopy in industrial applications.

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

Application fields of the ARYELLE 200 are the material and elemental analysis by means of laser-induced breakdown (LIBS) or Raman spectroscopy. Due to its compact design it is well suited for the industrial process control, e.g. in the steel, glass and ceramics industry or in pharmaceuticals, chemistry and environmental analytics.

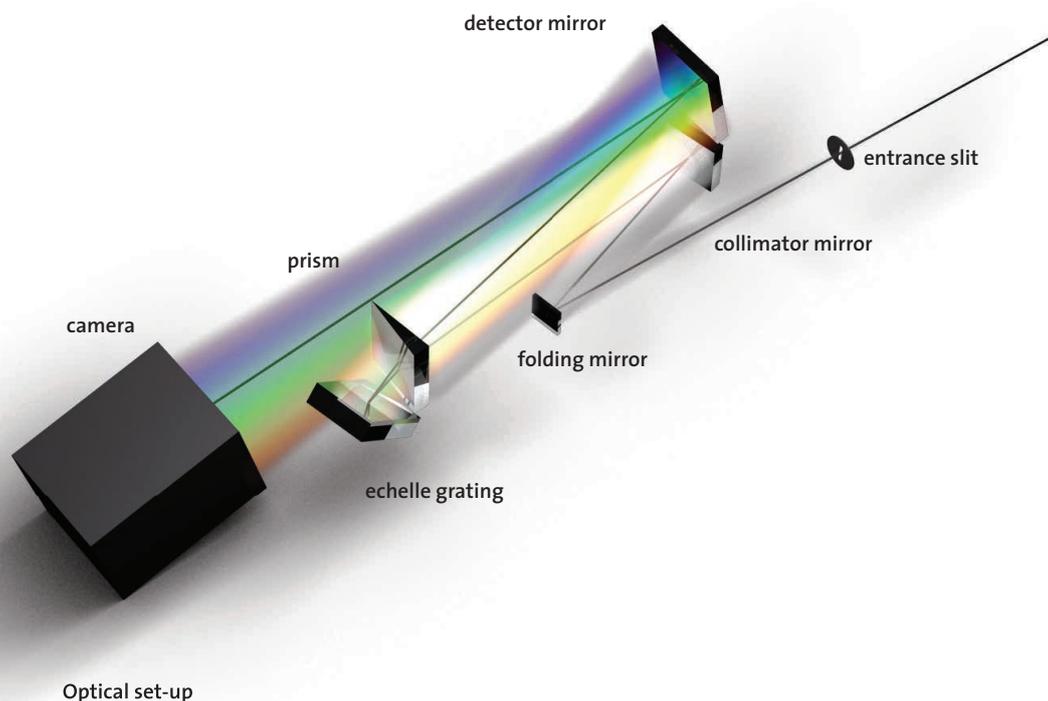
In combination with the MA 300 you get a complete LIBS system. Other customized system setups can be realized according to your requirements.

### Spectrometer concept

ARYELLE 200 has a focal length of 200 mm and an aperture of f/10. Depending on the required simultaneously detectable wavelength range, it is possible to measure spectra from the UV up to the NIR with a spectral resolving power of 7,000 to 15,000 (at a slit width of 40  $\mu\text{m}$ ).

The maximum sensitive area that can be used for detection is 20 x 20  $\text{mm}^2$ . Thus most CCD, EMCCD, ICCD and CMOS cameras of different suppliers can be used.

As standard detectors 1k x 1k CCD or ICCD cameras with an image area of 13 x 13  $\text{mm}^2$  are used for the spectra recording. Their combination with our standard dispersion unit result in large gap-free inspection ranges with a resolving power of greater than 9,000.



# Spectrometers

The internal shutter and the integrated mercury lamp for the automatic recalibration of the spectrometer as well as the intuitive software allow a comfortable operation of the spectrometer.

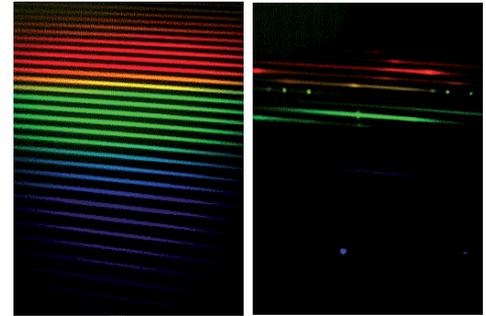
## Software

The controlling and evaluation software Sophi controls all spectrometer and detector functions. A two-dimensional spectrum is extracted from the detector raw data which is automatically analyzed with an integrated data base. The spectral lines are assigned to the corresponding elements and specified.

Quantitative analysis algorithms are integrated as well. For a quantitative evaluation, a calibration with comparable samples is necessary. Quantification curves can be generated with only few mouse clicks.

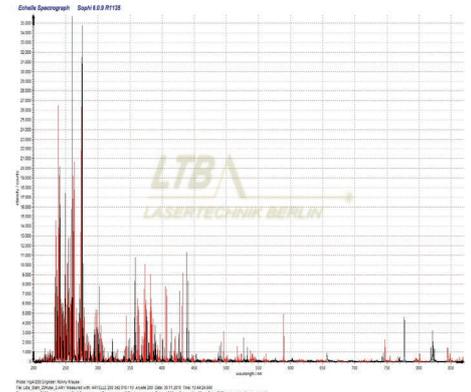
The integrated script language enables the automation of sophisticated or repeated measuring tasks. For spatially resolved measurements, an optional XYZ-table can be integrated in the script.

The optional SDK/LabView allows the complete access to all spectrometer functions and the incorporation into in-house software applications.

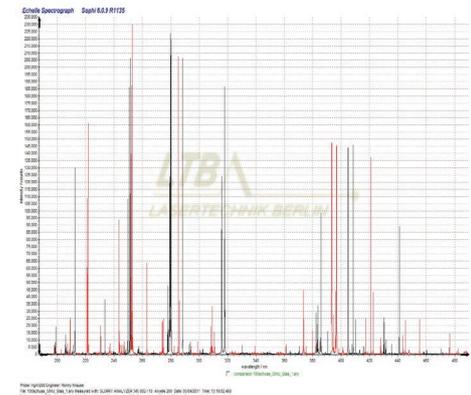


Spectrum of a tungsten lamp

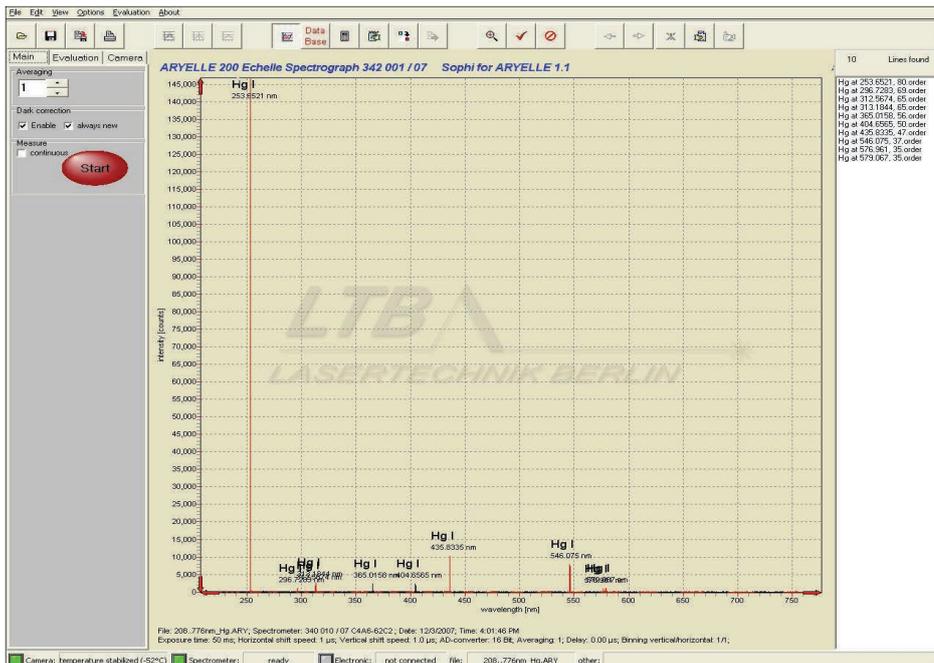
Visible spectrum of a fluorescent lamp (400 - 800 nm)



Highly resolved spectrum of a steel sample  
Resolving power 9,000



Part of a spectrum of a glass sample  
Resolving power 9,000



## Software

We deliver complete solutions

# Spectrometers

## Specifications ARYELLE 200, typ.

Aperture	f/10
Focal length	200 mm
Slit width	40 $\mu$ m
Wavelength range	220 - 800 nm / 200 - 750 nm
Spectral resolving power	9,000
Spectral resolution	24 - 90 pm / 22 - 83 pm
Crosstalk	$5 \times 10^{-3}$ (ICCD) / $2 \times 10^{-3}$ (CCD) measured @ 253.652 nm and full slit height
Straylight	$1 \times 10^{-4}$
Detector	CCD/ICCD 1,024 x 1,024 pixels, 13 x 13 mm <sup>2</sup> image area
Dynamic range	15 bit, AD conversion 16 bit
Light coupling	SMA-fibre coupling
Wavelength calibration	With Hg lamp
Absolute accuracy	Spectral resolution/4
Computer	PC or laptop with Windows
Software	Sophi
Dimensions without detector (L x W x H)	(260 x 160 x 185) mm, (10.24 x 6.3 x 7.28) in
Weight without detector	7.3 kg (16.0 lbs)

other spectral resolutions and wavelength ranges are possible