Spectrometers

Specifications

Optical design	Echelle spectrometer with pre-monochromator and active wavelength stabilization
Wavelength range	Standard: 190 nm - 900 nm (175 nm – 1,100 nm on request)
Linear dispersion*	λ/225,000
Spectral resolving power λ / min. measurable FWHM	75,000 (150,000 possible)
Absolute accuracy	Spectral resolution/4
Simultaneous inspection range	1 – 10 nm (depending on the wavelength)
Dynamic range	16 bit
Detector	CCD line array detector 1,024 pixels or ICCD
Aperture	f/10
Exposure time min.	1 ms with CCD; 5 ns with ICCD
Light coupling	UV fibre down to 240 nm or mirror optics down to 175 nm
Control	automatic control of the motors and the calibration lamp via PC
Dimensions (L x W x H)	(750 x 310 x 230) mm
Weight	25 kg
Software	Sophi; LabView driver optional
Integrated mechanical shutter and motorised slit	

* Values apply for a CCD with 1,024 pixels and a pixel size of 13.5 µm

Subject to technical changes

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State: 1.5.2014

LTB LASERTECHNIK BERLIN

DEMON Spectrometers

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

DEMON*

Double-**E**chelle-**MON**ochromator

- **High spectral resolution**
- **High optical throughput**
- **Compact**
- **Highest absolute wavelength accuracy**

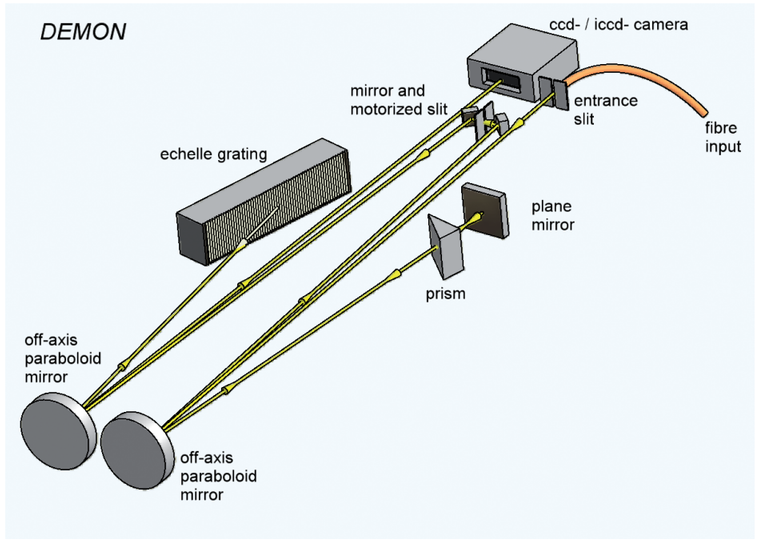
DEMON is an echelle spectrometer for the highly resolved spectral measurement of emission and absorption lines from the UV into the NIR range. By applying a CCD/ICCD array detector, the lines and their spectral vicinity within the corresponding inspection range can be recorded simultaneously.

The DEMON spectrometer is used in plasma spectroscopy (ICP, MIP, LIPS), spectrometric process control and in the laser development and manufacturing. A further area of application is the absolute wavelength determination of emission lines (e.g. diode lasers, distances between laser modes). The DEMON combines high temporal and spectral resolution with high optical throughput and is thus eminently suitable for many applications in industry and research where high-resolution spectrometry is required.

Spectrometer concept

The compact spectrometer system DEMON consists of a high-resolution Echelle spectrometer in sequence with a prism monochromator which is used for the selection of the inspection range. For this purpose the width of the prism monochromator exit slit, which serves also as entrance slit of the echelle spectrometer, is adjustable. The prism and the echelle grating are both arranged in a Littrow mounting and use the high imaging quality of parabolic mirror optics.

Advantages of this concept compared to echelle spectrographs with internal order separation which generate a two-dimensional spectrum are the very high spectral resolution, the high optical throughput obtained by exploiting the full height of the slit and the short read-out time of the detector due to “on-chip-binning”.



Optical set-up

Further advantages of the system are the low stray light level resulting from the double monochromator arrangement and active wavelength stabilization using internal calibration lamps. Thus, highest absolute wavelength accuracy can be achieved without extensive temperature stabilization.

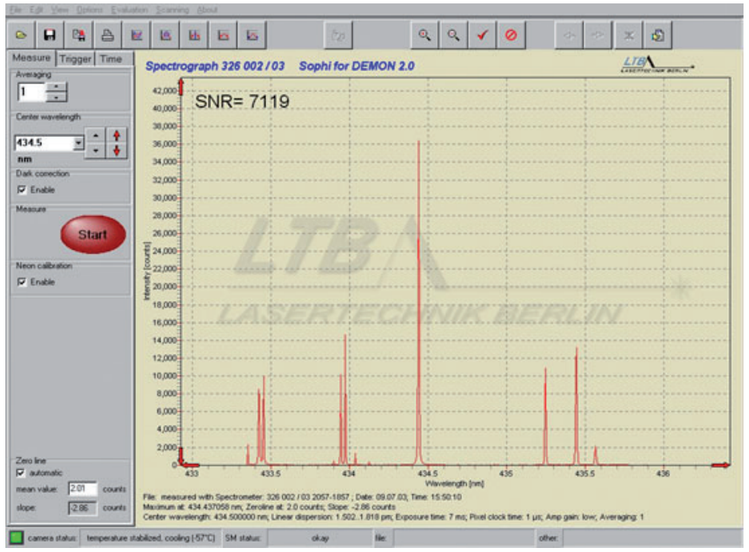
The system is extremely thermally and mechanically stable. By applying reflection optics with broad-band UV layers and a CaF2- prism chromatic aberrations are avoided and a large wavelength range from the DUV to the NIR is provided. The spectrometer illumination is realized using a SMA fibre coupling or mirror transfer optics.

The spectrometer is fully motorized and has an electro-mechanical shutter.

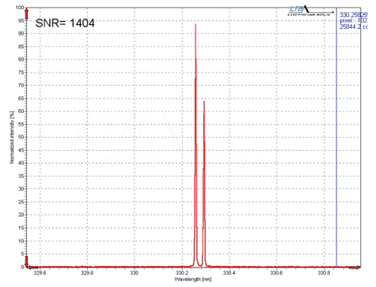
The DEMON can in principle be coupled with all cameras using 1/2” or longer CCD or ICCD arrays.

The spectrometer software Sophi provides for the complete control of the spectrometer as well as for the display and evaluation of the spectrum.

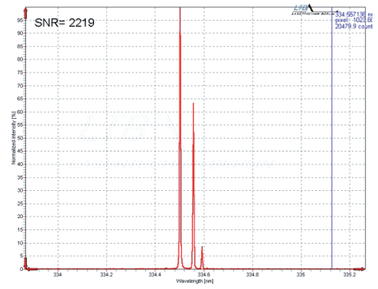
An optional LabView driver allows the remote control of the DEMON and the integration into complex test stands.



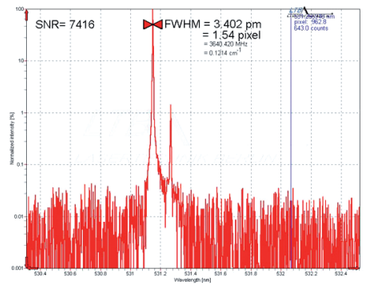
Software



Doublet of a Zn lamp at 277.08 nm



Triplet of a Zn-lamp at 280.08 nm



Mode spectrum of a diode laser at 800 nm

We deliver complete solutions

* The spectrometric system DEMON was developed (patented) by the ISAS Institute for Analytical Sciences, Department Berlin, and engineered for commercial use by LTB Lasertechnik Berlin GmbH.