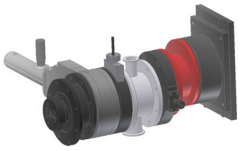
H+P SPECTROSCOPY
DR. HOERLEIN + PARTNER

Innovative XUV / VUV spectrometers

Our XUV / VUV spectrograph features an aberration-corrected flat-field wavelength coverage from 1nm to 200nm. Wide-band spectral measurements are possible by three gratings covering 1-20nm, 5-80nm, and 40-200nm. The spectrometer can be used without entrance slit to maximize light collection for a range of source distances.
Its modular design is able to match different experimental geometries and configurations. It features an integrated slit holder and filter insertion unit, as well as a motorized grating positioning.



Direct imaging of the source
- images the source directly onto the detector, does not require a narrow entrance aperture
- >80% of the incoming beam used for measurement
- ~20 times more light collection than standard versions, resulting in a signal-to-noise figure improved by the same ratio
- in some experiments, this improved signal strength is the crucial step for realizing a measurement at all

Rugged and robust design
- compact design, small footprint
- inherently insensitive against environmental disturbances and misalignment due to omission of entrance slit
- no moving parts
- absolute grating position monitoring for maintaining grating alignment
- can be bolted directly to a vacuum chamber
- capable of carrying its own weight

Special solutions
- non-magnetic instruments
- special housing geometries, in-chamber solutions
- EMP-protection
- special mounting situations
- UHV configurations
- etc

Customization
- every spectrometer is customized to exactly match the desired application, e. g.:
  - interfacing to experimental chambers
  - adaption of the source distance
  - integration of customer-supplied detectors
  - user-defined filter mounts

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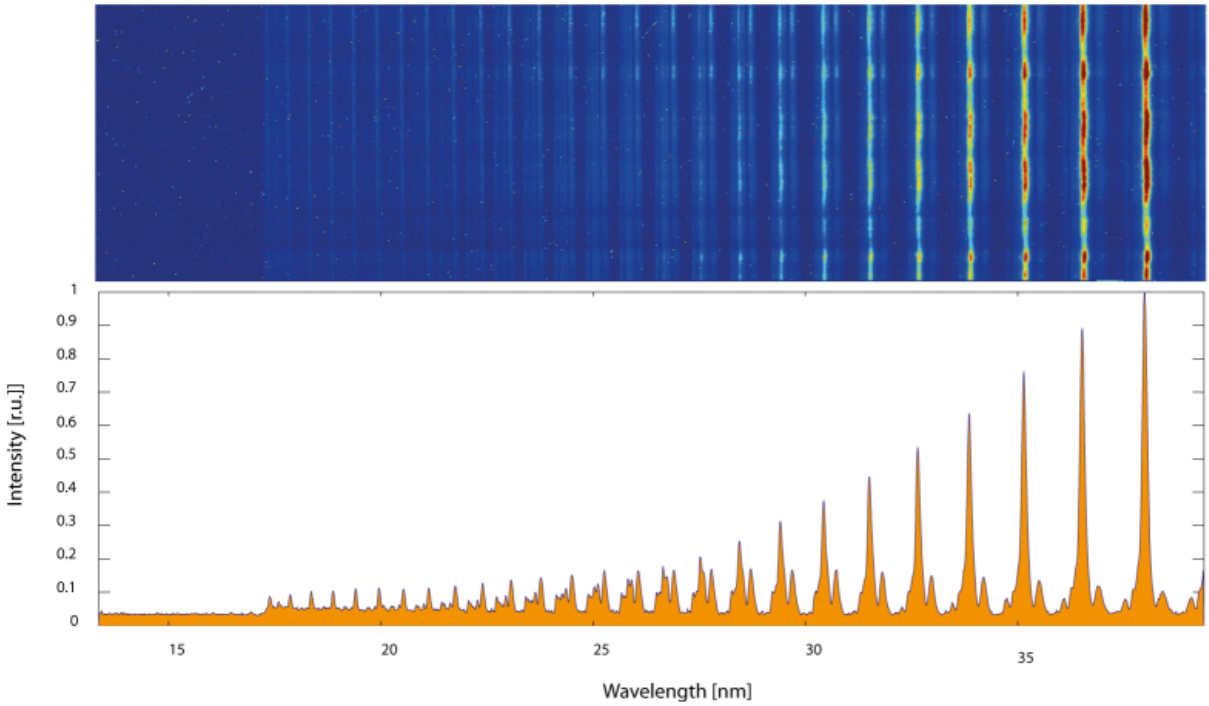

Sample measurement demonstrating the resolving power of the XUV spectrometer. The shown high harmonic spectrum is generated by the interaction of a single femtosecond laser pulse with a solid target and subsequent spectral filtering. The substructure inherent to the generation process is clearly resolved by the XUV spectrometer.
Top panel: raw image as recorded by the x-ray CCD camera. Bottom panel: harmonic spectrum obtained by column binning.

Characteristics:

- Flat-field grazing-incidence spectrograph
- Wavelength ranges: XUV coverage from 5 to 80 nm with a single grating,
  optional SXR wavelength range 1 to 20 nm. VUV version coverage 40 to 200 nm
- Large selection of geometry options
- Flexible choice of detectors: x-ray CCD-camera or MCP/fiber taper system
- Operating pressure $<10^{-6}$ mbar
  Oil-free pump system for stand-alone vacuum operation optionally available
- Customizable according to user requirements

	SXR grating		XUV grating			VUV grating
Wavelength [nm]	1 - 10	3 - 20	5 - 40	10 - 60	25 - 80	40 - 200
Operation Mode	slit-less	slit-less	slit-less	slit-less	slit-less	slit-less
Source distance* [m]	0.5	0.4 - 0.6	0.5	0.4 - 0.6	0.5 - 1.5	
Flat-Field size [mm]	35	45	21	50	50	
Dispersion [nm/mm]	0.2 - 0.35	0.3 - 0.4	0.5 - 0.65	0.7 - 1.1	0.9 - 1.3	≈ 2.0
Resolution [nm]	< 0.03	< 0.035	< 0.06	< 0.09	< 0.11	< 0.15

* Configurations for other source distances available

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