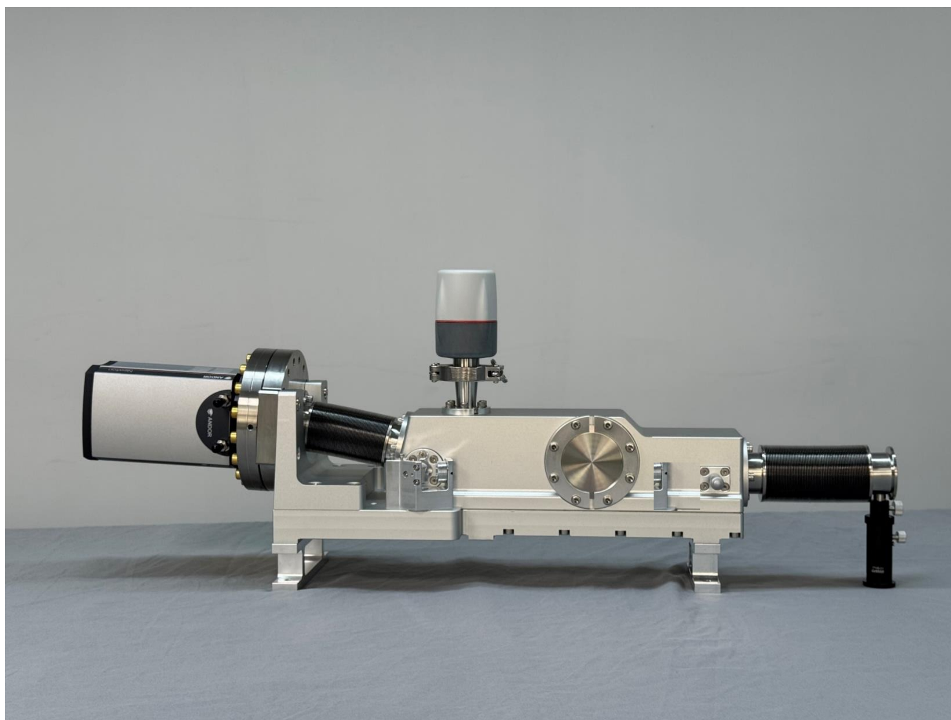
UES235-S1-1200

Soft X-ray (long) Flat-Field Grating Spectrometer



WaveQuanta UES235 series in laboratory configuration with Andor Newton CCD detector and KF40 vacuum interface.

Wavelength range	Spectral resolution	Grating density	Incidence angle
5–20 nm	**0.02 nm @ 13.5 nm**	**1200 l/mm**	**87°**

Request for Quote

Each system is configured to your target wavelength, detector, and vacuum interface.
Email sales@waveqvanta.com — typical lead time 12–16 weeks after PO.

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Working Principle

The UES235-S1-1200 is a flat-field grating spectrometer optimized for the 5–20 nm (Soft X-ray (long)) range. EUV and soft X-ray photons enter through a fixed-position in-line slit (5–300 µm, externally adjustable without vacuum break) and reach a 1200 l/mm concave grating at 87° grazing incidence.

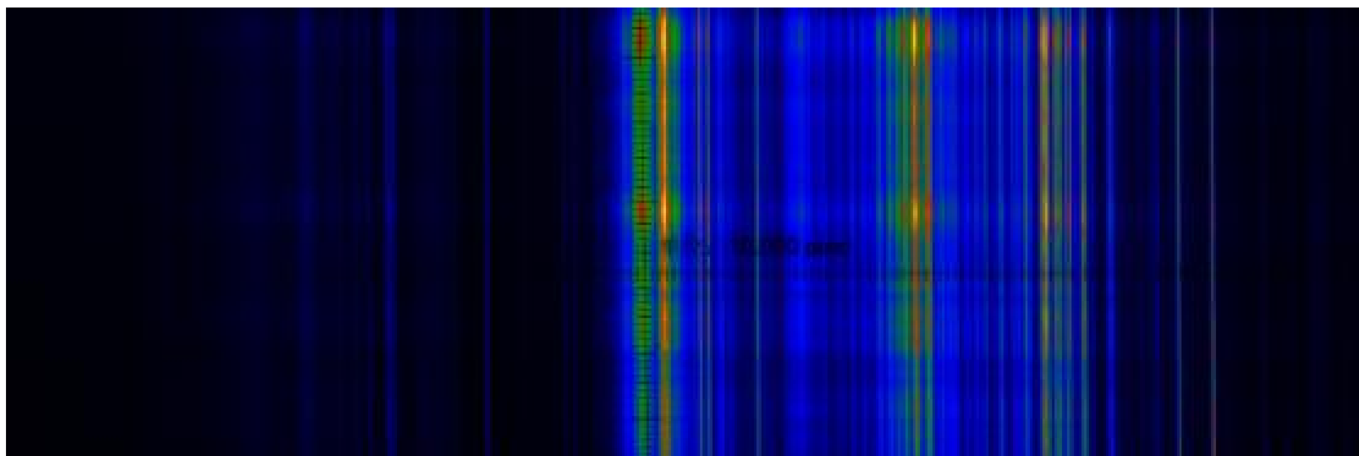
The grating disperses the incoming radiation by wavelength along its flat focal plane. A two-dimensional area detector (CCD, MCP, or sCMOS — selectable per application) sits on this focal plane, capturing the entire spectrum in a single exposure.

Because the grating produces a flat field, no scanning is required — the full wavelength range is acquired simultaneously. This makes the system ideal for single-shot diagnostics on transient sources (HHG, laser-produced plasma, FEL pulses).

A laser-assisted alignment system projects a visible reference beam co-linear with the EUV input axis. Operators can pre-align the input source on the optical bench with a He-Ne laser before evacuating the chamber, cutting commissioning time from hours to minutes.

Demonstration · Xenon discharge spectrum

Single-shot 2D image captured on the CCD focal plane — vertical streaks are individual Xe emission lines dispersed by wavelength.



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Specifications

Model	**UES235-S1-1200**
Spectral band	**Soft X-ray, long-wavelength**
Wavelength range	**5–20 nm**
Grating type	**Concave flat-field, 1200 l/mm**
Incidence angle (grazing)	**87°**
Spectral resolution	**0.02 nm @ 13.5 nm**
Resolution test conditions	**Detector pixel pitch 13.5 µm, minimum slit width**
Vacuum compatibility	**1 × 10■■ Pa baseline (UHV options to 10■■ Pa)**
Entrance slit	**5–300 µm in-line adjustable (no vacuum break required)**
Alignment system	**Built-in laser-assisted alignment (visible He-Ne)**
Detector options	**CCD (Andor, PI, Hamamatsu) · MCP (Hamamatsu, Photonis) · sCMOS (Andor Zy**
Spectrometer interface	**KF40 standard; CF flanges (CF40 / CF63 / CF100) optional**
Filter mount	**Inline metal-film filter holder; aperture customizable on request**
Mechanical envelope	**~ 600 × 200 × 250 mm (LxWxH, varies by config)**
Mass	**~ 12–18 kg depending on detector head**

Configuration Options

- Detector head: Andor DO920P-BEN CCD (1024×255, 26 µm pitch) · Andor Newton 940 · Hamamatsu C13440 sCMOS · MCP+phosphor+CCD combo for time-gated operation
- Grating coating: Au, Pt, Ni — selected for maximum reflectivity in the target wavelength sub-band
- Differential pumping: dual-stage between source and spectrometer for source pressures up to 1 mbar
- Custom slit drive: motorized + remote-controllable entrance slit (instead of manual micrometer)
- In-line filter wheel: 4 or 8 position automated filter changer (Al, Zr, Sn, Si3N4, Be foils)
- Synchronization output: TTL trigger I/O for FEL/laser shot-by-shot synchronization

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Applications — Soft X-ray, long-wavelength

13.5 nm EUV lithography source diagnostics

Direct measurement of in-band power and spectral purity of LPP-Sn and DPP-Sn sources — the operating wavelength of industrial high-NA EUV scanners.

HHG attosecond science

Characterize sub-femtosecond HHG pulses in the M-edge region; full harmonic comb up to 250 eV.

Synchrotron / FEL beamline

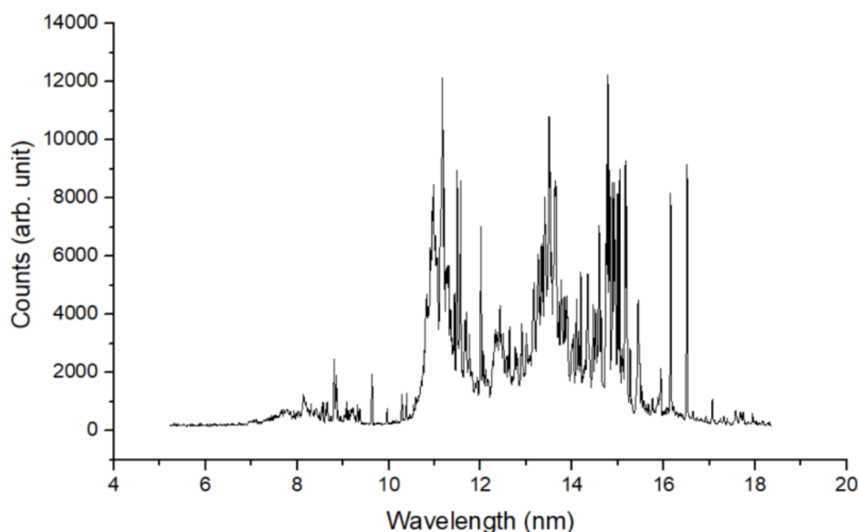
BL diagnostic for soft X-ray FEL stations (FERMI, LCLS-II, EuXFEL), 1st–10th harmonic monitoring.

Z-pinch / laser-produced plasma

Plasma emission spectroscopy of M-, N-, O-shell transitions in mid-Z elements; opacity studies.

Real Measurement Data · 13.5 nm Sn-LPP Source

Tin laser-produced plasma source emission spectrum captured with UES235-S1-1200 — covering the EUV lithography in-band region.



Y-axis: photon counts (arb. unit) · X-axis: wavelength (nm) · Spectral coverage 5–20 nm captured in single shot.

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