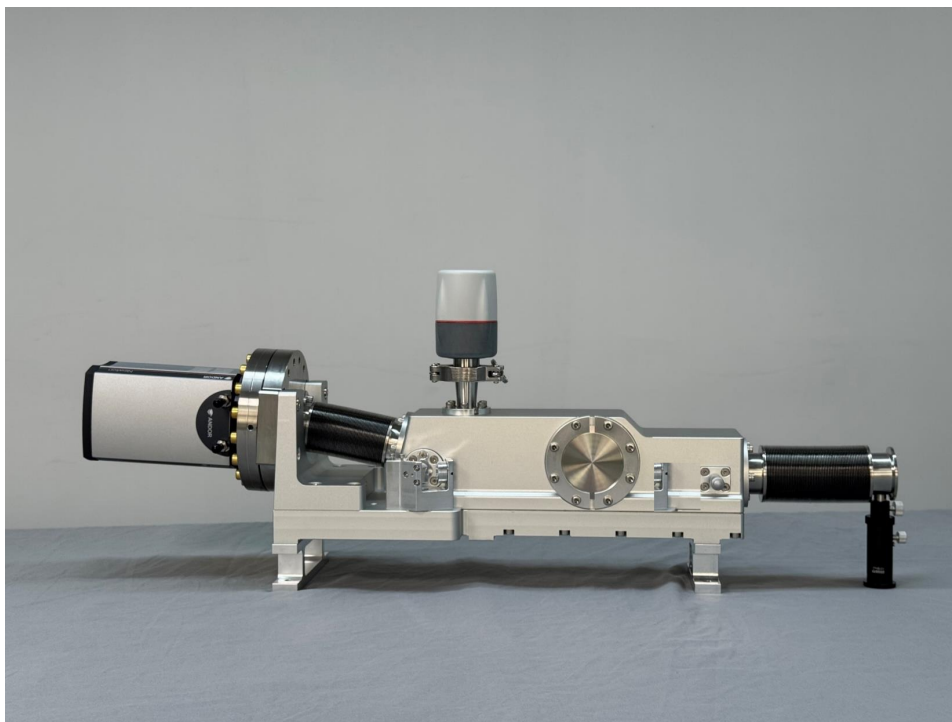


# UES235-S1-2400

## Soft X-ray (short) 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
<b>1–6 nm</b>	<b>0.01 nm @ 5 nm</b>	<b>2400 l/mm</b>	<b>88.65°</b>

### Request for Quote

Each system is configured to your target wavelength, detector, and vacuum interface.  
Email [sales@waveqanta.com](mailto:sales@waveqanta.com) — typical lead time 12–16 weeks after PO.

## Working Principle

The UES235-S1-2400 is a flat-field grating spectrometer optimized for the 1–6 nm (Soft X-ray (short)) 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 2400 l/mm concave grating at 88.65° grazing incidence.

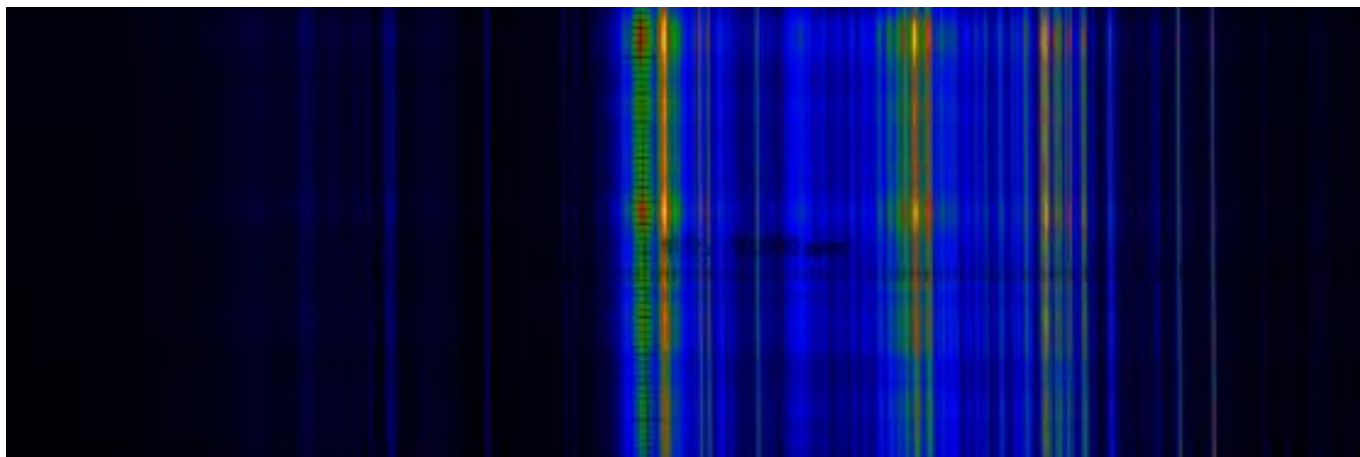
The grating disperses the incoming radiation by wavelength along its flat focal plane. A two-dimensional area detector (CCD, MCP, or sCMOS — selectable per application) sits on this focal plane, capturing the entire spectrum in a single exposure.

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.



## Specifications

Model	<b>UES235-S1-2400</b>
Spectral band	<b>Soft X-ray, short-wavelength</b>
Wavelength range	<b>1–6 nm</b>
Grating type	<b>Concave flat-field, 2400 l/mm</b>
Incidence angle (grazing)	<b>88.65°</b>
Spectral resolution	<b>0.01 nm @ 5 nm</b>
Resolution test conditions	<b>Detector pixel pitch 13.5 μm, minimum slit width</b>
Vacuum compatibility	<b>1 × 10<sup>-11</sup> Pa baseline (UHV options to 10<sup>-10</sup> Pa)</b>
Entrance slit	<b>5–300 μm in-line adjustable (no vacuum break required)</b>
Alignment system	<b>Built-in laser-assisted alignment (visible He-Ne)</b>
Detector options	<b>CCD (Andor, PI, Hamamatsu) · MCP (Hamamatsu, Photonis) · sCMOS (Andor Z)</b>
Spectrometer interface	<b>KF40 standard; CF flanges (CF40 / CF63 / CF100) optional</b>
Filter mount	<b>Inline metal-film filter holder; aperture customizable on request</b>
Mechanical envelope	<b>~ 600 × 200 × 250 mm (LxWxH, varies by config)</b>
Mass	<b>~ 12–18 kg depending on detector head</b>

## 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

## Applications — Soft X-ray, short-wavelength

### Water-window imaging diagnostics

2.34–4.4 nm soft X-ray band — natural contrast between carbon and oxygen for label-free biological imaging.

### High-Z K-shell plasma emission

Direct K-shell line measurement of low- to mid-Z elements (B, C, N, O, F) and L-shell lines of  $Z=14$ –28.

### Short-wavelength HHG

Push HHG into the water window via mid-IR drivers; verify cutoff energy and spectral content.

### Soft X-ray contact microscopy

Lab-scale alternative to synchrotron-based soft X-ray microscopy.

### Sample measurement data available on request

Reference measurements for Soft X-ray (short) band — including HHG comb, plasma emission and source-qualification spectra — are available via NDA. Contact [sales@waveqvanta.com](mailto:sales@waveqvanta.com) to request the application notes pack.