

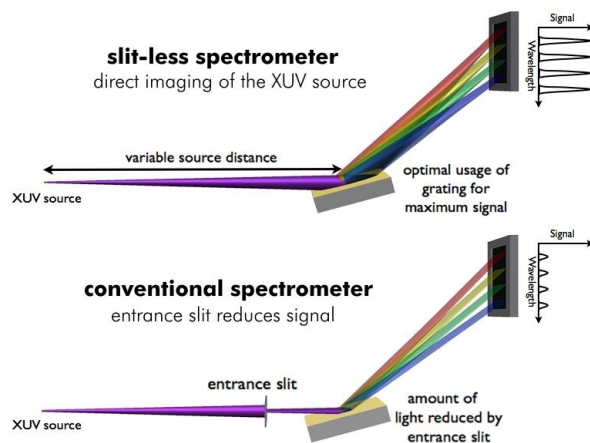
XUV SPECTROSCOPY ONE STEP AHEAD – no-slit spectrometers

Superior signal strength

The amount of light collected by the spectrometer is the key factor influencing its overall sensitivity and ultimately the most important feature required to obtain high quality data even from weak sources.

Conventional spectrometers use an entrance aperture (slit) at a fixed distance from the grating to create a small source which is then dispersed and imaged onto the detector.

In contrast to that the maxLIGHT spectrometers by HPS can be configured to directly image a radiation source positioned at any distance from the grating onto the detector. They do not require a narrow entrance aperture, thus 80% or more of the incoming beam can be used for measurement.



In practice, this allows for the collection of 15 to 25 times as much light from point-like radiation sources compared to a conventional spectrometer with a 100 μ m entrance slit without degradation in spectral resolution. Typically, the signal-to-noise figure is improved by the same ratio. In some XUV/VUV experiments, this improved signal strength is the crucial step for realizing a measurement at all.

Rugged design

The compact design of the HPS maxLIGHT spectrometers makes them inherently insensitive against mechanical and environmental disturbances (vibrations, acoustics, etc). No

moving parts on the outside and closed-loop motors with absolute position monitoring inside the instrument add to the robustness and allow for monitoring of the grating alignment at all times.

The spectrometer can be bolted directly to a vacuum chamber and is capable of carrying its own weight. No supporting table is required. The design also allows mounting in virtually any orientation.

Robust against misalignment

Owing to the rugged design, even smaller bumps do not influence the instruments alignment. If the instrument is knocked heavily while the motor control is enabled, the grating can be repositioned to the saved setting using the grating positioning motors.

In addition, the no-slit concept also makes the instrument inherently less sensitive to misalignment. Under typical operating conditions a beam misalignment in the dispersion direction on the entrance of the spectrometer by 500 μ m would lead to a signal reduction by more than 20% in a conventional instrument with entrance slit, while it is less than 10% for our design.

Flat-field imaging technology

The HPS maxLIGHT and highLIGHT spectrometers are based on proprietary high-quality aberration-corrected flat-field gratings. In contrast to conventional gratings, these focus all wavelengths onto a plane rather than a circle. This allows for positioning the entire detector in the focal plane of the grating for superior spectral resolution.

