

## TGS -Series Toroidal Grating Spectrograph



Coming from  
Synchrotron technologies



# A spectrograph to explore the 9.5 - 170 nm spectral range

## Applications

- High harmonic generation
- EUV and UV plasma analysis
- Light source characterization
- VUV Laser analysis

The TGS (Toroidal Grating Spectrograph) series is especially designed for analyzing the whole VUV wavelength range from 9.5 to 170 nm with high spectral resolution thanks to its bi-dimensional flat field.

A full spectrum range is simultaneously acquired in a single acquisition when adding an array detector. With a standard DN100CF exit flange mounted on XY table, a 25 mm array detector will be easily optimized in wavelength centering and focusing over the 40 mm flat spectrum.

## Features

- Single Toroidal Grating design
- Choice of three gratings
- Low astigmatism level
- Fixed grating position
- CCD flange adjustable in exit focal plane
- Choice of master or replica gratings
- Kinematic grating mount or two gratings slider
- Compact design
- High Vacuum compatible

## Options

- Ultra High Vacuum (UHV, a few  $10^{-9}$  mbar) version
- Slider for grating change under vacuum
- Removable entrance arm

## Benefits

- Optimized for throughput
- Optimized spectral range and resolution
- 40 mm Flat field spectrograph
- Robust
- In vacuum focus and central wavelength adjustment
- Optimize damage threshold or cost
- Interchangeable gratings
- Less room consuming and easy to install
- A few HV ( $10^{-6}$  mbar) – Optional UHV operation (a few  $10^{-9}$  mbar)

## Accessories

- EUV/UV light source
- CCD detectors
- Laser kit for easy alignment
- HM mirror chambers

Compact  
True flat field  
Robust  
Fixed position  
Grazing incidence  
High throughput  
Stable  
No motor

# A fixed system with flat field focal plane

## A grazing VLS designed to optimize resolution and efficiency

Based on HORIBA Scientific technology, the TGS series is designed around a single toroidal aberration corrected grating working in grazing incidence to increase the efficiency in the EUV range. Instead of having a fixed spherical grating and the exit port rotating on the Rowland circle as most of the other common designs, the TGS has the particularity to

have a flat field focal plane almost perpendicular to the exit axis of the instrument. Therefore, the CCD detector is fixed in position and acquires simultaneously a full spectrum with an unmatched throughput and resolution over the whole spectral range, making the TGS a very compact and stable solution.

## Gratings available

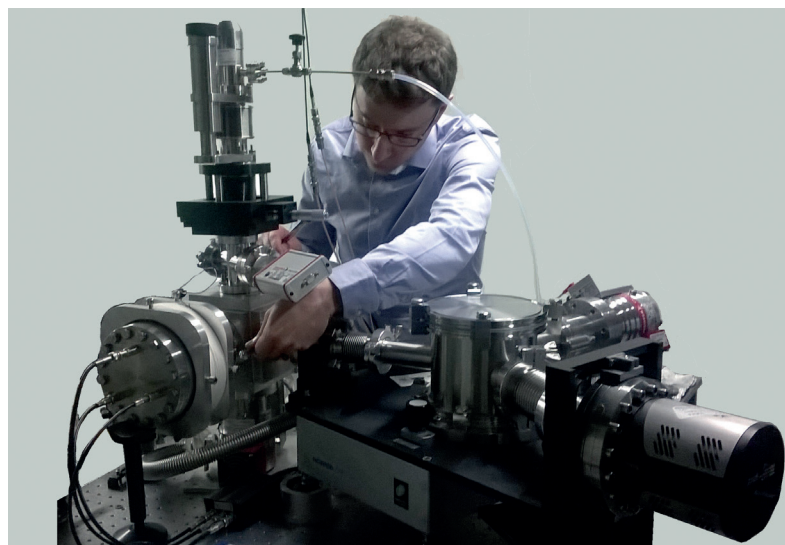
Model	Gratings		Spectral range		Exit Dispersion	Resolution (FWHM in nm)
	Part Number	Density (gr/mm)	nm	eV		
TGS300	541 00 220	2105	9.5 - 32	39 - 130	0.5 nm/mm at 9.5 nm, 0.6 nm/mm at 32 nm	2105 gr/mm 0.036 nm
	541 00 200	450	10 - 110	11 - 124	2.3 nm/mm at 10 nm, 2.7 nm/mm at 110 nm	450 gr/mm 0.075 nm
	541 00 210	290	15.5 - 170	7 - 80	3.5 nm/mm at 15.5 nm, 4.2 nm/mm at 170 nm	290 gr/mm 0.11 nm

Gratings are available in master or replica version

## TGS Specifications

	TGS300
<b>Optical design</b>	Fixed toroidal VLS Grating (single optic)
<b>Focal length</b>	300 mm
<b>Aperture</b>	f/30
<b>Optic coating</b>	Pt (Au in option)
<b>Deviation angle</b>	137°
<b>Vacuum</b>	Few 10 <sup>-6</sup> mbar (HV version) or Few 10 <sup>-9</sup> mbar (UHV version)
<b>Pumping flange</b>	DN63LF (DN63CF)

	TGS300
<b>Entrance port</b>	Micrometric slit (10 μm to 2 mm)
<b>Exit port</b>	Adjustable CCD port
<b>Entrance flange</b>	DN40 KF (DN 40 CF)
<b>Exit flange</b>	DN100CF
<b>Software</b>	HORIBA Scientific software
<b>PC Interface</b>	USB2



# HORIBA Scientific, Your partner in VUV Spectroscopy

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