



# RPMblue/FS

Rapid Photoluminescence Mapping System

The RPMblue/FS is designed to provide fast, accurate, precise and reliable PL metrology across the entire wavelength range. This includes from high-Al content AlGaIn alloys for GaN FET's and UV lasers/LED's to communication laser applications in the NIR and everything in between. The RPMblue/FS offers a catalogue of more than 15 standard lasers and the ability to fiber-feed a virtually unlimited array of sources.

The research grade 300 focal length monochromator can be fitted with up to three gratings and two array detectors — and, once configured, every optical component is selected under computer control. To ensure the highest possible wavelength accuracy, the RPMblue/FS contains its own built-in spectral source for monochromator calibration.

### Standard Features

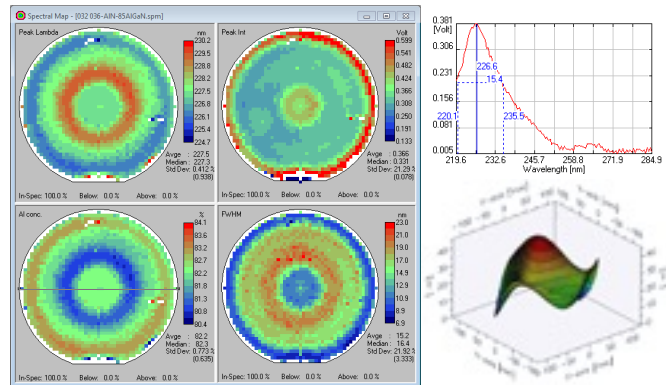
- Wafer Sizes ≤ 200mm and sample pieces
- up to 80 wph @ 2 mm spatial resolution on 2" wafers
- Optional fully automated wafer handling with up to 3 cassette station
- Fast R-T stage for mapping or measurement at individual coordinates
- research grade 300mm focal length spectrometer
- large numerical aperture optics, for high photon collection efficiency and low intensity detection capability
- Up to 4 lasers (2 internal, 1 diode laser and 1 external) ranging from 213 nm - 1064 nm excitation wavelength
- Up to 3 gratings for high resolution spectral PL mapping
- Up to 2 detectors covering 200 nm to 2.6 μm
- Integrated white light source for thickness and reflectance measurements
- high speed non spectral mapping mode @ 2000 pps
- high speed spectral mapping mode @ 200 pps

### Optional Features

- wafer bow measurement
- Accucolor® real LED color determination
- Overview® reactor statistics
- multiple PL peak statistics
- SECS-GEM factory automation

### Most flexible yet most capable

For high-volume applications, the RPMblue/FS is easily upgradeable to robotic wafer handling. Robot handling and full SECS-GEM factory automation reduces operator interaction to a minimum, enhances throughput efficiency and reduces wafer handling damage. The system can handle any substrate with a diameter up to 8".

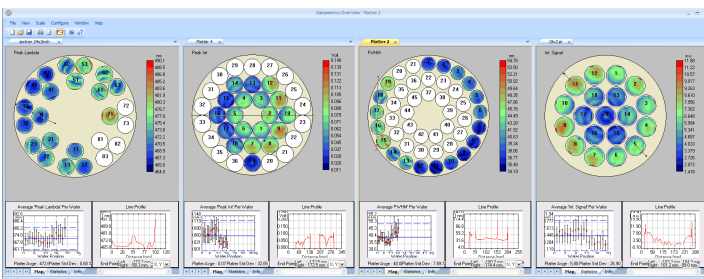


By incorporating a DUV 213 nm emission laser and specialized optics, the RPMblue/FS is ready to provide fast and accurate PL measurements for UV-A/B/C LED's as well as Al content up to 90% in AlGaIn alloys.

An internal wafer stage mounted temperature sensor allows compensation for peak lambda shifts due to temperature variation especially important to InP based communication laser devices.

The system also can easily detect crystalline defects and changes in crystalline composition in SiC power devices.

The flexible configuration of the RPMblue/FS allows applications for R&D as well as fully automated high volume production for most III-V materials in a robust and low maintenance framework.



General

wafer sizes <sup>1</sup>	2", 3" 4", 5", 6", 8", sample pieces
excitation laser sources	213 nm, 266 nm, 325 nm, 355nm, 375 nm, 405 nm, 488nm, 532 nm, 640 nm, 658 nm, 785nm, 808 nm, 852 nm 980 nm, 1064 nm please enquire for details
detection range options	200 nm - 1100 nm @ 512/1024 px 900 nm - 1700 nm @ 256 px 900 nm - 2040 nm @ 256 px 900 nm - 2600 nm @ 256 px
Thickness range <sup>6</sup> [µm]	0.2 µm - 60 µm
bow range [µm]	± 500 µm

Throughput<sup>5</sup>

wafer size	@ 1 mm spatial resolution (wph)	@ 2 mm spatial resolution (wph)
2"	50 wph	80 wph
3"	30 wph	60 wph
4"	20 wph	50 wph
6"	10 wph	30 wph
8"	6 wph	20 wph

Photoluminescence Intensity

Reproducibility <sup>4, 6</sup>	± 15 % (±3 sigma)
Repeatability <sup>3, 6</sup>	± 7.5 % (±3 sigma)

Reflectivity Intensity

Variation <sup>3, 6</sup>	± 10 % (±3 sigma)
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PL wavelength Accuracy<sup>2</sup> and Precision<sup>3</sup>

Grating	Accuracy (nm) 1024 CCD	Reproducibility (nm) (± 3 sigma)		Resolution (nm)	
		Lo Resolution	Hi Resolution	Lo Resolution	Hi Resolution
		CCD	CCD	CCD	CCD
1200g/mm	0.33 nm	0.52 nm	0.52 nm	0.26 nm	0.065 nm
600g/mm	0.66 nm	0.75 nm	0.52 nm	0.52 nm	0.13 nm
300g/mm	1.33 nm	1.04 nm	0.75 nm	1.04 nm	0.26 nm

Photoluminescence Peak Matching

Grating	Tool to Tool Matching (nm)
1200 g/mm	± 0.26 nm
600 g/mm	± 0.52 nm
300 g/mm	± 1.04 nm
150 g/mm	± 2.08 nm

Reflectivity Matching

Grating	Tool to Tool Matching (nm)
1200 g/mm	± 10 % (±3 sigma)
600 g/mm	
300 g/mm	
150 g/mm	

## Facilities

Dimensions	automatic wafer handling: 1449 W x 1430 H x 1066 D (mm) manual wafer handling: 757 W x 1430 H x 1066 D (mm)
Weight	automatic wafer handling: ~460 kg manual wafer handling: ~230 kg
Electrical	Single phase, power consumption 100~240V (pre-configured), 2000 VA min.50/60 Hz
Vacuum	55 l/min (2 cfm) at 170 mbar (25" Hg) absolute.
Temperature	20° - 26° C ambient, <math>\pm 1^\circ\text{C}</math> over 24h stability
Relative Humidity	20 - 80 % (non-condensing)
Heat dissipation	1450 BTU/h
Vibration Isolation	VC-A
conformance	E95, CE

- 1) chuck exchange required when switching substrate sizes.
- 2) Wavelength calibration accuracy will be verified with Hg calibration lamp by measuring Hg-spectrum of light scattered from a white, polytetrafluoroethylene (PTFE) target sample.
- 3) sample will be measured 20 times without wafer loading/unloading in between measurements. Sample cooling interval of 60 seconds will be applied between each measurement to avoid accumulation of heat in material due to sample irradiation with laser. The cooling time maybe altered, if necessary for heat dissipation.
- 4) sample will be measured 20 times including wafer loading/unloading in between measurements. Sample cooling interval of 60 seconds will be applied between each measurement to avoid accumulation of heat in material due to sample irradiation with laser. The cooling time maybe altered, if necessary for heat dissipation.
- 5) RPMBlue-FS with 1024 pixel CCD is able to run up to 80pps scan rate. With overhead time of 33 second (robot load/unload), 2mm spatial resolution, the following table lists the spec for throughput material dependent
- 6)

Specifications subject to change without notice.

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