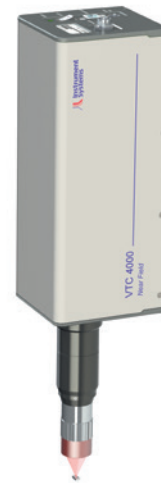


VTC 4000

Near-field analysis of VCSEL arrays

Key features at a glance

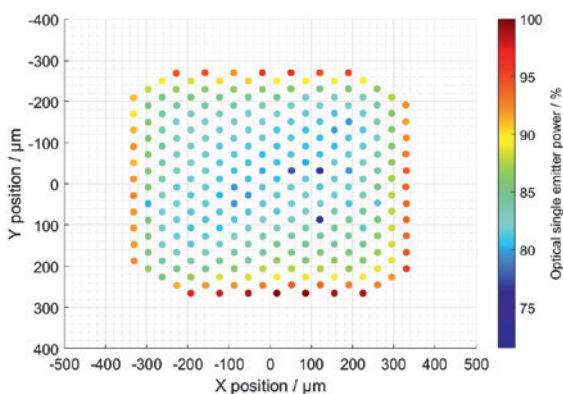
- ▲ 2D measurement solution for near field characterization of VCSEL arrays
- ▲ Radiant power, polarization, position, divergence and peak wavelength for all single emitters
- ▲ Flat-field and absolute power calibration, traceable to national metrology standards
- ▲ Easy software integration by LumiSuite SDK



The VTC 4000 is Instrument System's VCSEL testing camera for comprehensive near-field analysis of complete VCSEL arrays. It enables the absolutely calibrated, traceable and polarization-controlled 2D characterization of all relevant parameters for every single emitter on the array. The VTC 4000, consisting of a camera and corresponding microscope optics, is capable of simultaneously determining position, radiant power and polarization of single emitters on a VCSEL array in a single-shot camera measurement. This allows quick and easy detection of defect emitters on the array. The integrated polarization analysis ensures an unprecedented radiant power measurement accuracy with minimal error budget.

\\ SINGLE EMITTER BEAM WAIST AND SPECTRAL ANALYSIS

By implementation of a z-translation stage, the camera enables the characterization of the single emitter beam profiles. In this way, the single emitters can be characterized in terms of beam waist, numerical aperture and M^2 value. For analysing the spectral parameters, the camera is optionally available in a version with fiber output. Connecting the VTC 4000 to a high-resolution CAS spectroradiometer enables measuring the peak wavelength of every single emitter. The VTC 4000 can be easily integrated into handler systems with x-, y- and z- translation stages. This enables automated characterization of complete VCSEL arrays.



▲ 2D power measurement of single emitters on a VCSEL array.

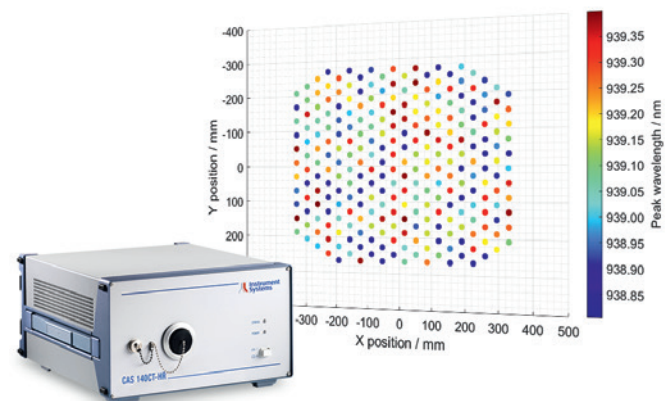
\\ MEASUREMENT RESULTS

For each single emitter:

- » Position (x and y)
- » Radiant flux
- » Polarization angle and degree
- » Defect emitter analysis

With translation stages / optional features:

- » Waist
- » Numerical aperture
- » M^2 value
- » Focus position
- » Peak wavelength



▲ 2D peak wavelength analysis of single emitters on a VCSEL array with the VTC 4000 version incl. fiber output. A high-resolution CAS spectroradiometer and an xy-translation stage is required.

\\ TECHNICAL SPECIFICATIONS

VTC 4000	
General	
Dimensions (L x W x H) (including objective lens, no handle)	Version without fiber connector: 462 mm x 112.6 mm x 121 mm Version with fiber connector: 462 mm x 185 mm x 121 mm
Weight	Version without fiber connector: approx. 3.6 kg Version with fiber connector: approx. 4.2 kg
Power Supply	24 V
Operating temperature range	15 – 35 °C
Interface	Ethernet
Trigger I/O	Yes
Camera system	
Camera sensor	12 Megapixel CMOS
Camera spectral range	400 – 1000 nm
OD Filter	Standard OD9 (optimized for 650 – 1000 nm), others on request
Calibration	Possible in the range of 910 to 980 nm (e.g. 940 ±3 nm)
Digital resolution	0.35 µm
Optical resolution	2.2 µm (at 940 nm)
Field of View	1.4 mm x 1.0 mm
Integration times	100 µs – 1 s
Typical acquisition time ²⁾	~700 ms
Radiometric measurement accuracy ¹⁾	6 %
NA	0.26
Wavelength measurement with CAS spectrometer ³⁾ (optional, for peak wavelength measurement)	
Spectral range	800 nm – 1000 nm
Spectral resolution (typical)	0.12 nm – 0.4 nm
Data point interval (typical)	0.05 nm – 0.16 nm
Filter wheel with optical density filters (typical)	OD 0.5/1/1.5/2/2.5
Measuring ranges (typical)	80 nm – 160 nm
Wavelength accuracy	±0.05 nm
Integration time	4 ms – 65 s
Spatial resolution	Diameter 20 µm

¹⁾ With factory calibration traceable to PTB.

²⁾ Including data processing and transfer time per image

³⁾ Exact specifications depend on the chosen high-resolution CAS model.

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