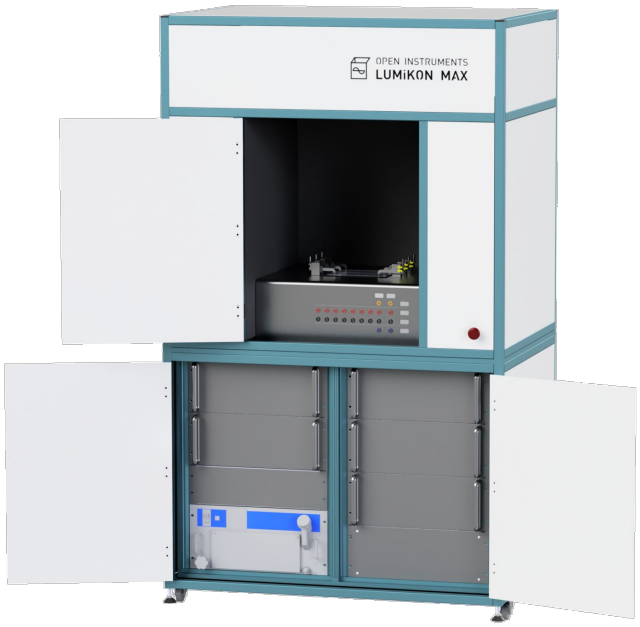
LUMiKON MAX

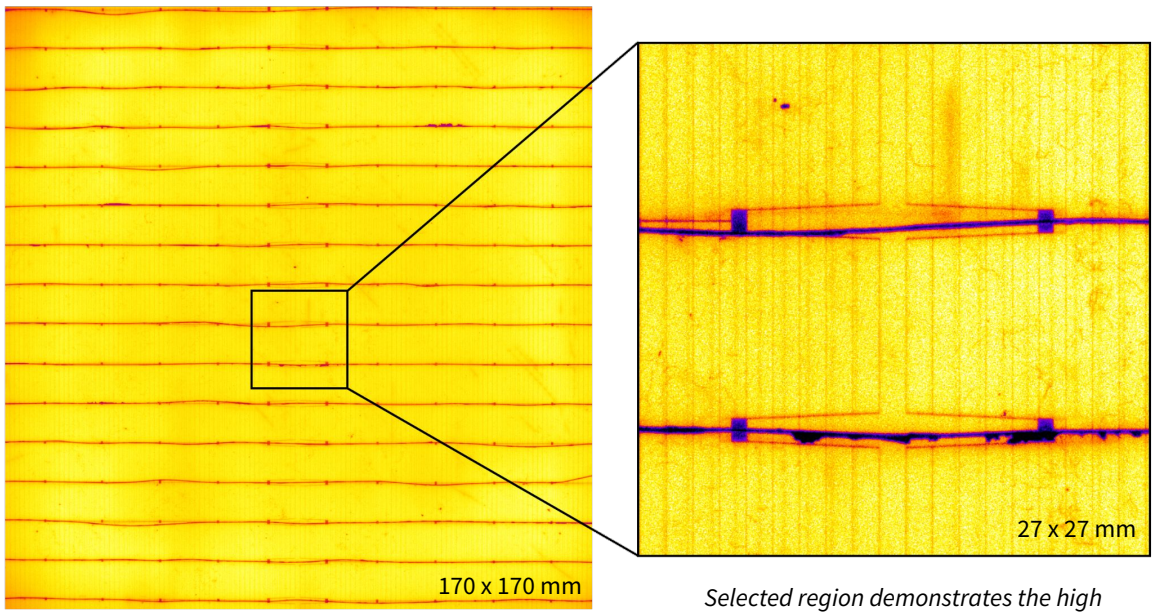
Advanced automatic photoluminescence imaging system for perovskite, silicon, and perovskite-silicon tandem solar cells and wafers

LUMiKON MAX is our feature-rich flagship system, combining decades of experience in photovoltaic characterization. It is specifically designed for testing of full size perovskite, silicon, and perovskite-silicon tandem solar cells, up to 210 mm x 210 mm. Key electrical and optical parameters can be measured as a function of time, temperature, and/or injection level.



Features

- Directly produces iVoc images, allowing quantitative comparison between all images
- Automatically optimizes system settings to produce images with the highest quality
- Individually adjustable dual-wavelength light source, enabling measurement of implied fill factor, implied MPP, and pseudo-JV
- Exchangeable temperature-controlled sample stage from +5 to +85 C
- Built-in 4-quadrant power supply for IV measurement and electrical biasing
- Flexible and easy-to-use recipe based automation to study cell performance as a function of time, temperature, irradiance, and/or current injection



Cropped image of a 182 mm tabbed silicon solar cell

Selected region demonstrates the high resolution capability of the LUMiKON MAX

Specifications

Material compatibility	Perovskites, silicon, or others emitting from 600 to 1000 nm
Sample size	Up to 210 mm x 210 mm
PL / EL imaging modes	iVoc, iFF, iMPP, pseudo-JV, raw PL/EL
Image calibration	Factory calibrated for absolute irradiance in µW/cm^2
Image resolution	Minimum 100 µm for 210 mm x 210 mm FOV, 20µm for 25 mm x 25 mm FOV
Image format	4176 x 4176 (17 MP), 16-bit TIFF, pixel binning optional
Illumination source	445 nm / 100 W and 915 nm / 150 W fiber-coupled diode lasers
Illumination control	0.01 to 1.2 Suns equivalent photon flux, independent for each laser
Illumination uniformity	+/-5% over the sample plane
Sample temperature	+5°C to +85°C
EL biasing	Four quadrant, ±30 A, ±10 V, constant voltage or current
IV precision	±1m V, ±30 mA with sub-100 ms settling time
Spectral point scanning *	550-1000 nm and/or 1000-1700 nm, selectable for any image pixel
Hyperspectral imaging *	Fast full-area imaging with 550-1000 nm spectral range
Automation	Recipe-based system for automatic measurement sequences
Custom algorithms	User-defined Python image processing functions
Input power	110-240 VAC +/- 10%, 1.8 kW
Dimensions	117 cm x 197 cm x 84.5 cm (W x H x D)
Weight	285 kg
Compliance	EN60950-1, EN60824-1, and EU Machinery Directive 2006/42/EC

** Optional upgrade*

Optional additions

- XY mapping of single-point emission spectra in the visible and/or NIR, for time-resolved measurement of bandgap and iVoc
- High-speed full area hyperspectral imaging to measure compositional and bandgap variation
- Stacked silicon/InGaAs sensor to extend the spectral range to 1700 nm, enabling visualization of silicon defect luminescence
- Calibration kit to ensure reported contactless iVoc remains accurate

Contact

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