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SPEKTRUM

WAVELENGTH CONVERTER

- 1.9 - 5.3 µm Input
- 682 - 886 nm Output
- Instant Conversion From MIR to VIS/NIR
- Low Noise

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THE TECHNOLOGY

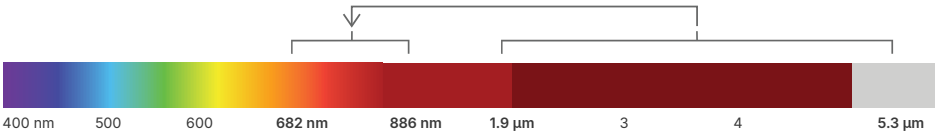
WAVELENGTH CONVERTER | SPEKTRUM

The NLIR wavelength converters convert mid-infrared light into visible/near-infrared light.

NLIR's SPEKTRUM Wavelength Converter converts light in the range of 1.9 – 5.3 µm directly to 682 – 886 nm, enabling detection using standard silicon-based detectors.

Depending on the application and measurement requirements, various VIS/NIR detectors can be utilized to analyze the spectral content of the wavelength-converted mid-infrared light.

For increased convenience, the device is fiber-coupled at both input and output ports.



The SPEKTRUM Wavelength Converter converts light in the broadband range of 1.9 – 5.3 µm to VIS/NIR broadband wavelength of 682 - 886 nm.

DETAILS

NLIR's SPEKTRUM Wavelength Converter coupled to a 130 kHz Wasatch Photonics Cobra-S OCT Spectrometer.

NLIR's SPEKTRUM Wavelength Converter coupled to an Avantes AvaSpec-VARIUS Spectrometer.

SPEKTRUM Wavelength Converter

Optical Bandwidth Input	1.9 – 5.3 µm
Optical Bandwidth Output	682 – 886 nm
Conversion Resolution	2.5 cm^{-1}
Conversion Efficiency	2 × 10^{-4}
Output noise spectral density (682-886 nm)	120 fW/nm
Optical Input[1]	SMA-905 Fiber Connector
Stability[2]	± 1 % over 24 hours
Optical Output	FC/PC Fiber Connector
Rec. IR Fiber Core Size	100, 200, 300 µm
Polarization Sensitivity	Vertical
Power Consumption	60 – 90 W
Supply Voltage	19 V
Operating Temperature	18 – 30 °C
Measurements (L × W × H)	306 × 200 × 100 mm
Weight	5 kg
Mounting	4 × 1" Posts

[1] Free-space input available
[2] ± 1 °C ambient variation

CONVERSION EFFICIENCY

The conversion efficiency of 2 × 10^{-4} is a result of the broad wavelength range covered by the unit.

While this value may seem low, the impact on measurement sensitivity is mitigated by the elimination of mid-infrared background radiation and the lower noise characteristics of silicon-based detectors used for detection.

Unlike conventional mid-infrared detectors, which are limited by thermal background radiation and internal detector noise, the upconverted signal is detected in a spectral range where these noise sources are negligible ■

TECH DRAWINGS AND APPLICATION EXAMPLES

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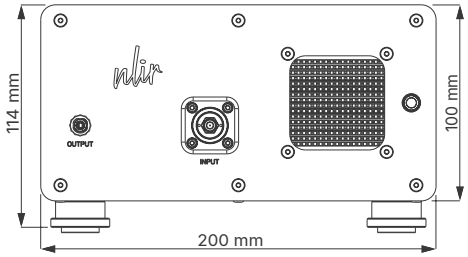
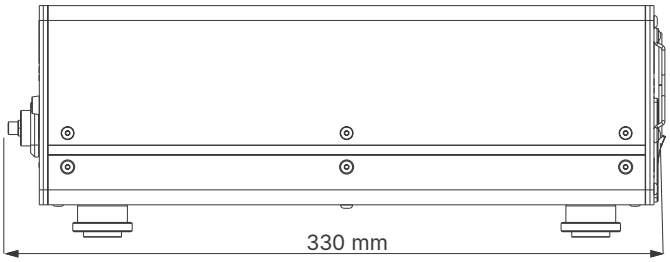
TECH DRAWINGS

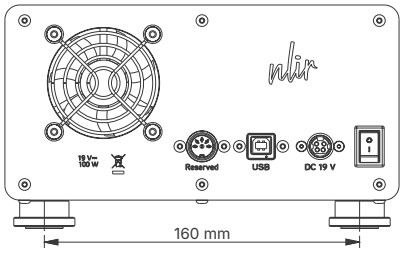
FRONT



SIDE



BACK



DESCRIPTION

The drawings provide detailed dimensions and an overview of the NLIR's SPEKTRUM Wavelength Converter's design.

The front view highlights the input port, output port and ventilation grille.

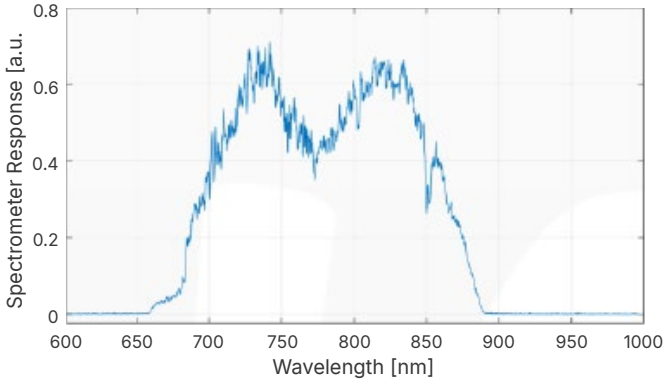
Note that all measurements are in mm.

ANALYZE MID-INFRARED SPECTRA

NLIR's SPEKTRUM Wavelength Converter provides a simple and effective way to utilize conventional VIS-NIR equipment that many labs already have available.

The graph below shows the output of the SPEKTRUM Wavelength Converter on a VIS/NIR grating spectrometer at 70 ms exposure time.

The input is light from NLIR's FIBER Light Source coupled directly to the wavelength converter. Light in the bandwidth 1.9 - 5.3 µm is converted to 682 - 886 nm.

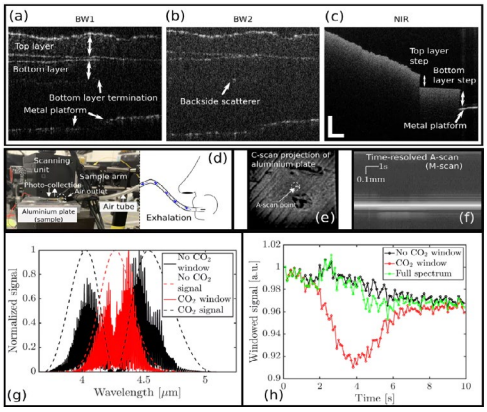


Mid-infrared light converted to VIS/NIR light using SPEKTRUM Wavelength Converter.

OPTICAL COHERENCE TOMOGRAPHY

Optical Coherence Tomography (OCT) is a well-established imaging technique that is now finding new applications in the mid-infrared region.

NLIR's upconversion technology has been used to achieve kHz line-rate spectroscopy, enabling real-time mid-infrared OCT in the 2.0 – 5.0 µm wavelength range. This advancement opens up new possibilities for OCT in materials such as ceramics, resins, and coatings ■



"High-resolution mid-infrared optical coherence tomography with kHz line rate" fom Niels M. Israelsen et al., 2021.

Do you have any questions? Do not hesitate to contact us: info@nlir.com +45 7174 7870