

Broad-Bandwidth Mid-Infrared Optical Parametric Amplifier



Broad-bandwidth MIR pulses at high repetition rate

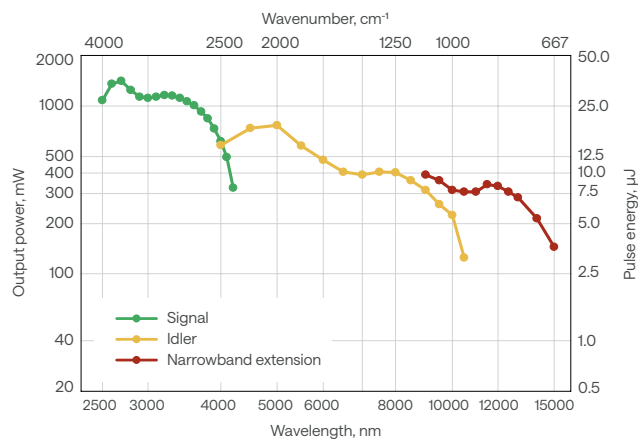
Continuously tunable in 2500 – 15 000 nm range

Short-pulse high-energy auxiliary output at 2000 nm

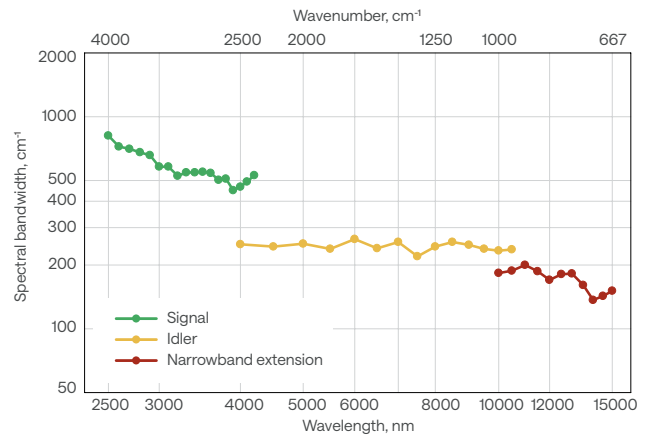
Pumped by industrial-grade lasers for high stability

CEP-stable option

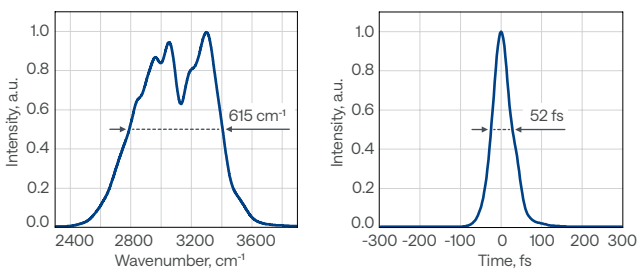
ORPHEUS-MIR typical tuning curves
Pump: 80 W, 2 mJ, 40 kHz



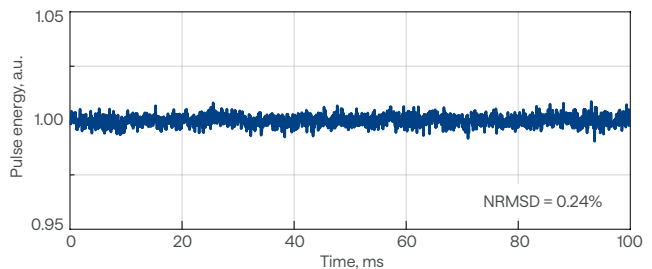
ORPHEUS-MIR typical spectral bandwidth



ORPHEUS-MIR typical output spectrum (left) and pulse duration (right)
Measured at ≈ 3000 nm



ORPHEUS-MIR pulse-to-pulse energy stability
Measured at ≈ 3000 nm



Specifications

NEW

MAIN OUTPUT (2500 – 10 000 nm)

Mode of operation	Non-collinear	Collinear ¹⁾
Tuning range	2 500 – 4 000 nm (signal) 4 000 – 10 000 nm (idler)	2 500 – 4 500 nm (signal) 4 500 – 10 000 nm (idler)
Maximum pump power	80 W	
Pump pulse energy	200 μJ – 3 mJ	
Pulse duration	< 100 fs	< 400 fs (< 100 fs with dispersion compensation ¹⁾
Conversion efficiency ²⁾	> 1.2% @ 3 000 nm > 1.0% @ 3 500 nm > 0.6% @ 5 000 nm > 0.3% @ 9 000 nm	
Spectral bandwidth ³⁾	> 300 cm ⁻¹ @ 2 500 – 4 000 nm > 200 cm ⁻¹ @ 4 000 – 10 000 nm	
Long-term power stability, 8 h ⁴⁾	< 2% @ 5 000 nm	
Pulse-to-pulse energy stability, 1 min ⁴⁾	< 2% @ 5 000 nm	

AUXILIARY OUTPUT (2 000 nm)

Output wavelength ⁵⁾	2000 ± 100 nm
Pulse duration	< 50 fs
Conversion efficiency ²⁾	> 8%
Spectral bandwidth	> 350 cm ⁻¹

WAVELENGTH EXTENSION (10 000 – 15 000 nm)

Tuning range ⁶⁾	10 000 – 15 000 nm	n/a
Pulse duration	< 350 fs	
Conversion efficiency ²⁾	> 0.2% @ 12 000 nm	
Spectral bandwidth	100 – 200 cm ⁻¹	

PUMP LASER REQUIREMENTS

Mode of operation	Non-collinear	Collinear
Pump laser	PHAROS or CARBIDE	
Center wavelength	1030 ± 10 nm	
Maximum pump power	80 W	
Repetition rate	Single-shot – 400 kHz	
Pump pulse energy	200 μJ – 3 mJ	
Pulse duration ⁷⁾	180 – 500 fs	

ENVIRONMENTAL & UTILITY REQUIREMENTS

Refer to www.lightcon.com

¹⁾ Collinear mode is achieved with additional external separator box. Dispersion compensation is optional.

²⁾ Specified as a percentage of pump power.

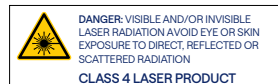
³⁾ FWHM (full width at half maximum).

⁴⁾ Expressed as NRMSD (normalized root mean squared deviation).

⁵⁾ Not tunable, optimized for best overall performance. Not simultaneous to OPA output.

⁶⁾ Not available in collinear-output configuration.

⁷⁾ FWHM, assuming Gaussian pulse shape.



Drawings

ORPHEUS-MIR drawings

