

ORPHEUS | MIR

Ultrafast Source for Broadband Mid-IR Pulses

FEATURES

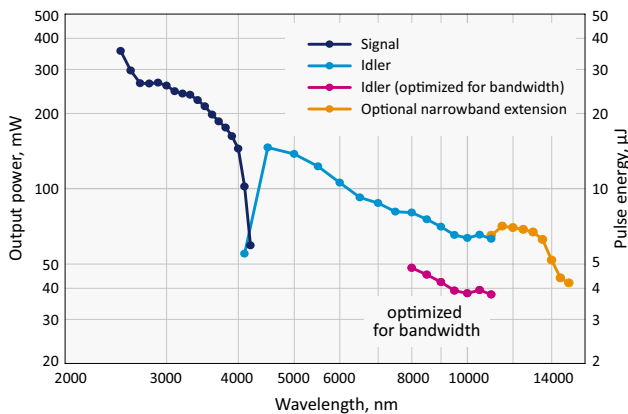
- Broad bandwidth up to 500 cm^{-1}
- Broad tuning range 2500 nm – 11000 nm
- Short pulse duration <100 fs
- Up to 80 W pump power, up to 2 mJ pump energy
- Auxiliary broadband output at ~2000 nm
- Optional narrowband extension up to 15000 nm
- Optional CEP stability

APPLICATIONS

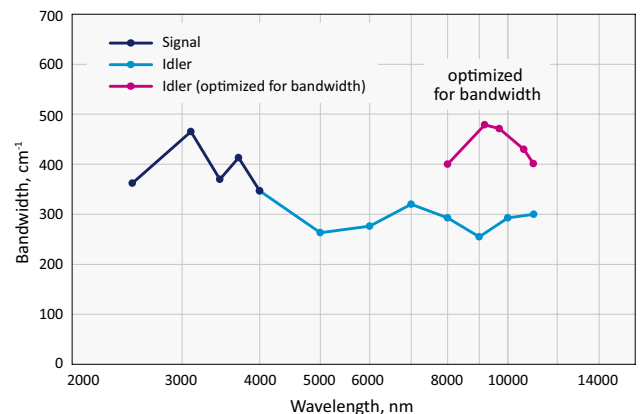
- Broadband vibrational sum-frequency generation (SFG) spectroscopy
- Time- and angle-resolved photoemission spectroscopy (TR-ARPES)
- Two-dimensional infrared (2D IR) spectroscopy
- High-harmonic generation (HHG) in solids
- Other infrared spectroscopy and strong-field physics applications



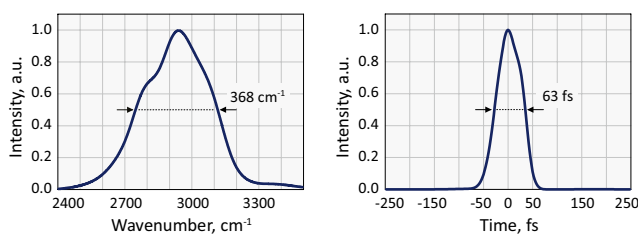
ORPHEUS-MIR is a versatile system optimized for the efficient generation of broadband mid-IR pulses. In general, it is a two-channel optical parametric amplifier (OPA), followed by a difference frequency generation (DFG) stage. The system provides broadband pulses in the tuning range of 2.5 – 11 μm and reaches up to 15 μm with optional narrowband extension. Signal and Idler outputs are available simultaneously, but they are a Signal-Idler pair; thus, their wavelengths are linked. The system architecture is well-suited for high energy and high power PHAROS and CARBIDE lasers.



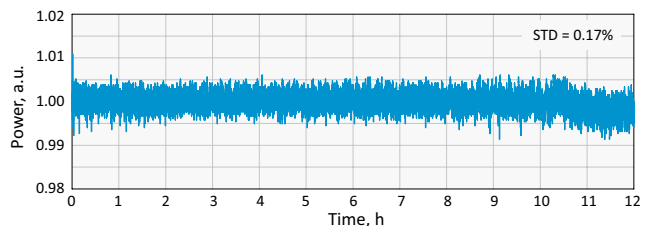
Typical tuning curve of **ORPHEUS-MIR**.
Pump: 20 W, 2 mJ, 10 kHz



Typical spectral bandwidth of **ORPHEUS-MIR**



Typical output spectrum (left) and pulse duration (right).
Measured at 3450 nm

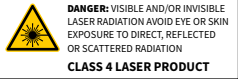


Long-term power stability of **ORPHEUS-MIR**.
Measured over 12 h at 5000 nm

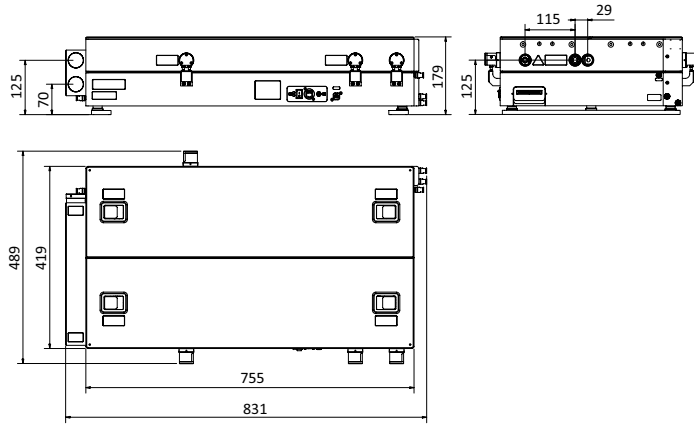
SPECIFICATIONS

Model	ORPHEUS-MIR	
MAIN OUTPUT (2500 – 11000 nm)		
Mode of operation	Standard	Optimized for bandwidth ¹⁾
Tuning range	2500 – 4000 nm (Signal) 4000 – 11000 nm (Idler)	
Maximum input power	80 W	
Input pulse energy	200 μJ – 2 mJ	
Pulse duration	< 100 fs	
Pulse energy conversion efficiency ²⁾	> 1.2 % @ 3000 nm > 1.0 % @ 3500 nm > 0.6 % @ 5000 nm	
	> 0.3 % @ 9000 nm	> 0.2 % @ 9000 nm
Pulse bandwidth	> 300 cm ⁻¹ @ 2500 – 4000 nm > 200 cm ⁻¹ @ 4000 – 8000 nm	
	> 200 cm ⁻¹ @ 8000 – 11000 nm	> 350 cm ⁻¹ @ 8000 – 11000 nm
Long term power stability (8 h)	< 2 % @ 5000 nm	
Pulse energy stability (1 min)	< 2 % @ 5000 nm	
AUXILIARY OUTPUT 1 (~2000 nm)		
Output wavelength	~2000 nm (not tunable, optimized for best overall performance)	
Pulse duration	< 50 fs	
Pulse energy conversion efficiency ²⁾	> 8 %	
Pulse bandwidth	> 350 cm ⁻¹	
AUXILIARY OUTPUT 2 (1350 – 2000 nm)		
Tuning range	1350 – 2000 nm	
Pulse duration	< 300 fs	
Pulse energy conversion efficiency ²⁾	Contact sales@lightcon.com	
Pulse bandwidth	60 – 150 cm ⁻¹	
OPTIONAL WAVELENGTH EXTENSION (11000 – 15000 nm)		
Tuning range	11000 – 15000 nm	
Pulse duration	< 300 fs	
Pulse energy conversion efficiency ²⁾	> 0.2 % @ 11000 – 15000 nm	
Pulse bandwidth	100 – 150 cm ⁻¹ @ 11000 – 15000 nm	

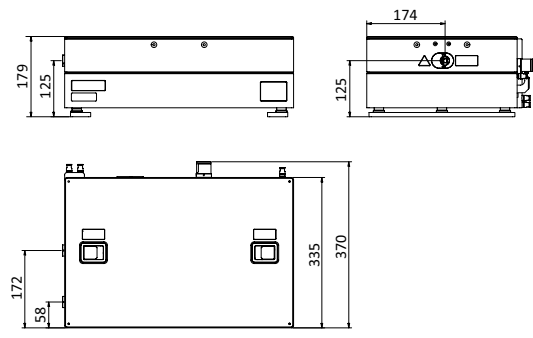
¹⁾ Optimized for maximum spectral bandwidth at expense of pulse energy conversion efficiency.
²⁾ Specified as a percentage of total input power into ORPHEUS-MIR.



OUTLINE DRAWINGS



ORPHEUS-MIR, OPA module outline drawings



ORPHEUS-MIR, DFG module outline drawings