

Spirit-OPA®

High Repetition Rate Automated Optical Parametric Amplifier



The Spirit-OPA is an automated collinear optical parametric amplifier (OPA) specifically built and optimized for the Spirit® ultrafast laser. The turn-key, high repetition rate Spirit femtosecond laser combines with the widely tunable Spirit-OPA optical parametric amplifier to create a powerful, user-friendly tunable source for high repetition rate ultrafast spectroscopy.

The Spirit-OPA includes a built-in second harmonic generator to convert the Spirit IR output into a 520 nm pump beam for the OPA, which then generates signal and idler in the red-infrared range (620–2700 nm). To further enhance its wavelength tuning capabilities, the OPA can be equipped with an optional harmonics. The result is straightforward access to a broad, gap-free wavelength range from UV to the mid IR (210 nm – 16 μ m).

The Spirit-OPA can be factory optimized for a wide range of pump pulse energies (up to 120 μ J). This versatility allows for multiple configurations such as pumping a single OPA for maximum output energy or simultaneously pumping two or more OPAs for multi-beam, multi-color time resolved experiments. The Spirit-OPA-30 is optimized for high power application and can be pumped with up to 30 W.

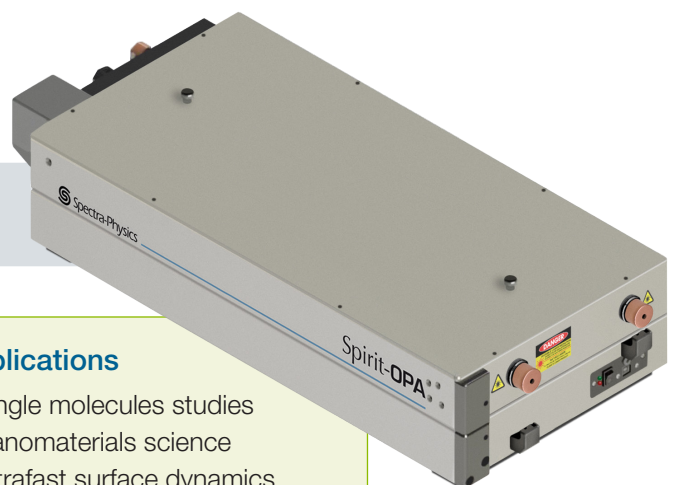
With its high repetition rate (100 kHz and above) and μ J level pulse energy, the Spirit family complements Spectra-Physics' kHz, multi-mJ class Spitfire® Ace™ and Solstice® ultrafast amplifiers.

Spirit-OPA Advantage

- Built and optimized for Spirit ultrafast laser
- High repetition rate operation (up to 1 MHz)
- Computer controlled operation
- Ultra-wide gap-free wavelength coverage from UV to mid IR
- Access to SHG with high efficiency

Applications

- Single molecules studies
- Nanomaterials science
- Ultrafast surface dynamics
- Multi-dimensional spectroscopy



Spirit-OPA-30 Specifications¹

Spirit-OPA-30	
Tuning Range	Conversion Efficiency ^{2,3}
630–1020 nm (signal) 1040–2600 nm (idler)	>12% at peak (signal and idler combined)
Output from Optional Harmonics Module	
315–510 nm (SH of signal)	>2.4% at peak
520–630 nm (SH of idler)	
210–315 nm (TH of signal)	>0.8% at peak
2200–4200 nm (DFG1)	>3% at 3000 nm
4000–16000 nm (DFG2)	>0.2% at 10000 nm
Pump Requirements from Spirit⁴	
Wavelength	1030 nm or 1040 nm
Pulse Energy ⁴	20–120 μ J
Average Power ⁵	Up to 30 W
Pulse Width (typical)	350 fs

1. Due to our continuous product improvement program, specifications are subject to change without notice.

2. Specified at pulse energy >40 μ J.

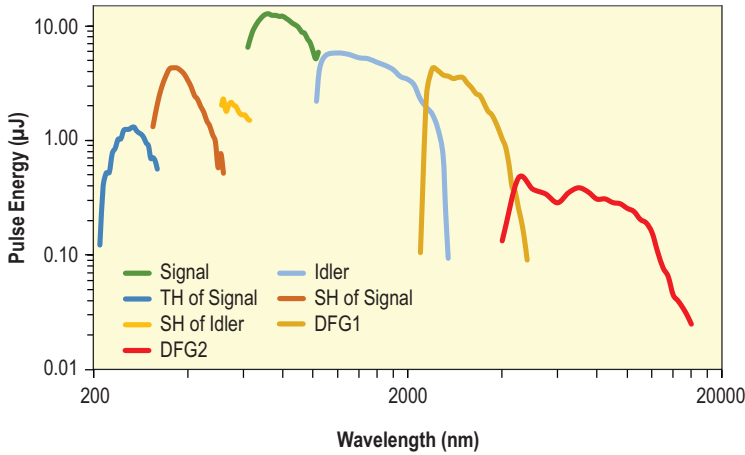
3. Efficiency defined as OPA output power divided by Spirit pump power at the OPA input port.

4. Please contact Spectra-Physics for available options at lower or higher pump pulse energy levels.

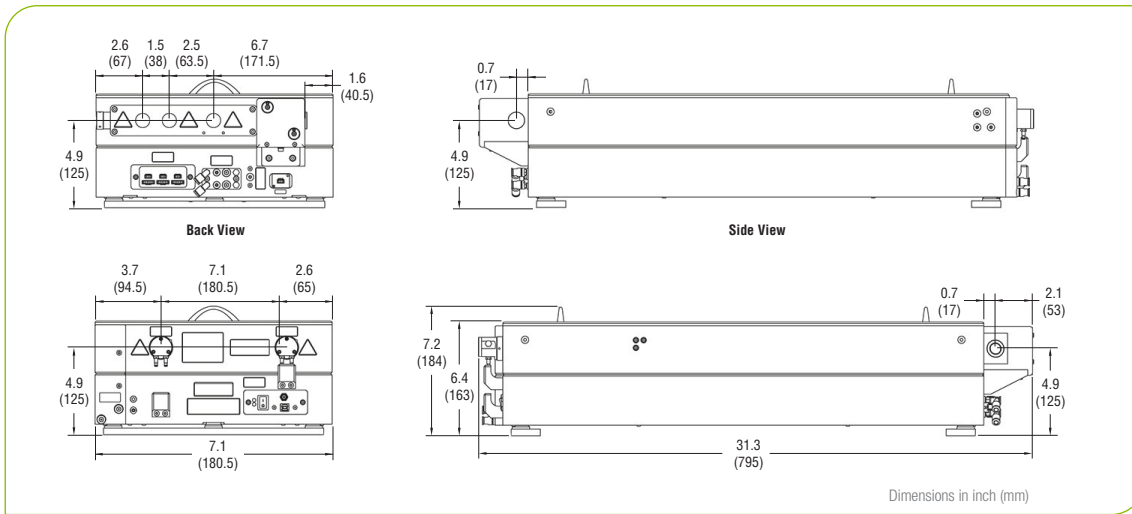
5. Please contact Spectra-Physics for available options at higher average pump power.

Spirit-OPA-30

Typical Spirit-OPA-30 Performance
(Spirit pump pulse energy 120 μJ)¹



1. Typically measured performance; not a guaranteed or warranted specification.



Spirit-OPA-30 Dimensions



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