

Solstice® APX

Next-Generation, High-Energy,
Industrial One-Box Ultrafast Amplifier

mks | Spectra-Physics

The Spectra-Physics® Solstice APX laser system is our next-generation femtosecond ultrafast amplifier. Engineered to rigorous industrial standards, the Solstice APX exhibits exceptional beam pointing stability, excellent pulse-to-pulse energy stability, and enhanced long-term power stability and beam quality.

Solstice APX amplifiers incorporate advanced opto-mechanics, industry-proven pump and seed lasers, and a user-friendly interface to deliver a hands-free ultrafast light source with the performance required for demanding applications.

Solstice APX amplifiers maintain stable operation

across a 10°C ambient temperature window by employing advanced opto-mechanics and temperature-stabilized modules.

Solstice APX amplifiers feature a motorized compressor stage, enabling fine-tuned compression compensation for optimal OPA pumping.

Solstice APX systems deliver >7 W at 1 kHz, >8 W at 5 kHz, and >7 W at 10 kHz with pulse width configurations ranging from <35 fs to <120 fs. These high energy outputs, exceptional beam quality, and unrivaled stability make the Solstice APX ideal for a range of advanced applications.

The Solstice APX Advantage

- Enhanced beam pointing stability
- Unprecedented pulse-to-pulse energy stability and long-term power stability
- Patented regenerative amplifier cavity design
- Configurable pulse width and repetition rate
- Exceptional beam quality
- Motorized adjustable compressor stage



Applications

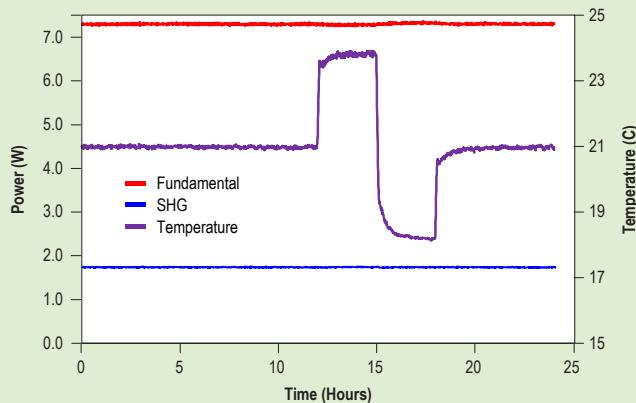
- OPA pumping
- 2D IR spectroscopy
- Ultrafast pump-probe spectroscopy
- Nonlinear optics
- Four wave mixing spectroscopy
- Ultrafast micromachining on a wide variety of materials

Solstice APX Specifications^{1, 10}

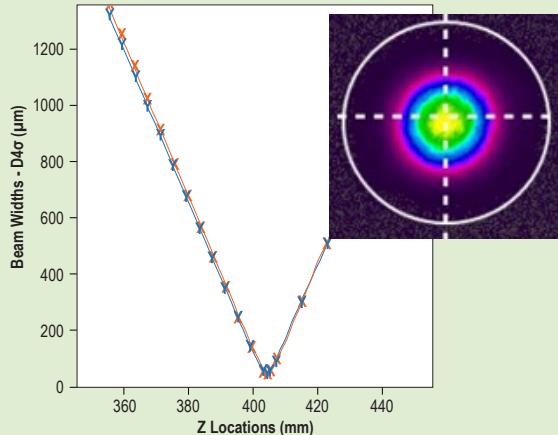
Solstice APX				
Output Characteristics				
Pulse Width ^{2, 3}	<35 fs – <120 fs			
Repetition Rate ⁴	1 kHz	5 kHz	10 kHz	
	>7.0 W	>8.0 W	>7.0 W	
Average Power	Ascend® 60:	>5.0 W	>6.0 W	>5.0 W
	Ascend 40:	>7.0 mJ	>1.6 mJ	>0.7 mJ
Pulse Energy	Ascend 60:	>5.0 mJ	>1.2 mJ	>0.5 mJ
	Ascend 40:			
Pre-Pulse Contrast Ratio ⁵	1000:1			
Post-Pulse Contrast Ratio ⁶	100:1			
Operating Temperature Range	±5°C			
Energy Stability	<0.4% rms			
Power Stability	<0.4% rms over 24 hours			
Beam Pointing Stability	<4 µrad (rms) <15 µrad/°C, peak-to-peak			
Wavelength ^{8, 9}	780–820 nm ⁹			
Spatial Mode	TEM ₀₀ (M ² <1.20, both axes)			
Beam Diameter (1/e ²)	10–11 mm (nominal)			
Polarization	Linear, Horizontal			
Oscillator Output Options				
Sol-Seed-50	>250 mW at 35 fs >500 mW at 100 fs ¹¹			
Sol-Seed-100	>500 mW at 35 fs >1 W at 100 fs ¹²			
Mai Tai® HP Seeding	>2 W at 100 fs ¹¹			
Additional Options				
Non-standard Repetition Rates	Pre-configured repetition rate from 1–10 kHz			
Variable Beam Splitting	Motorized continuously variable beam splitter for additional uncompRESSED output ¹³			
External Compressor	Modular motorized compressor stage			
Chirped-Mirror Module	Additional compressor module to reduce peak intensity on routing optics			

1. Due to our continuous product improvements, specifications are subject to change without notice.
2. A Gaussian pulse shape (0.7 deconvolution factor) is used to determine pulse width (FWHM) from autocorrelation signal as measured with a Newport PulseScout® autocorrelator.
3. Pulse width must be specified at time of purchase.
4. The desired optimum repetition rate can be specified at the time of purchase or additional optics sets can be used to reconfigure the amplifier. Any system can be operated at reduced repetition rates through internal divide-down electronics.
5. Defined as the ratio between peak intensity of output pulse to peak intensity of any pre-pulse that occurs >1 ns before the output pulse.
6. Defined as the ratio between peak intensity of output pulse to peak intensity of any post-pulse that occurs >1 ns after the output pulse.
7. At constant temperature.
8. For wavelength extension through SHG, THG, FHG or OPA, please contact Spectra-Physics.
9. Performance specifications apply at peak of gain curve. Tuning range for <35 fs version: 795–805 nm.
10. The Solstice APX is a Class IV – High-Power Laser, whose beam is, by definition, a safety and fire hazard. Take precautions to prevent exposure to direct and reflected beams. Diffuse as well as specular reflections can cause severe skin or eye damage.
11. Allows simultaneous output with Amplifier operation
12. Amplifier cannot be run while Sol-Seed-100 output is active
13. 10% reduction in output power

Fundamental and SHG Stability Solstice APX 1 kHz, 7 mJ¹



Beam Profile¹ Solstice APX 1 kHz, 7 mJ¹



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

Solstice APX Dimensional Drawing

