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.

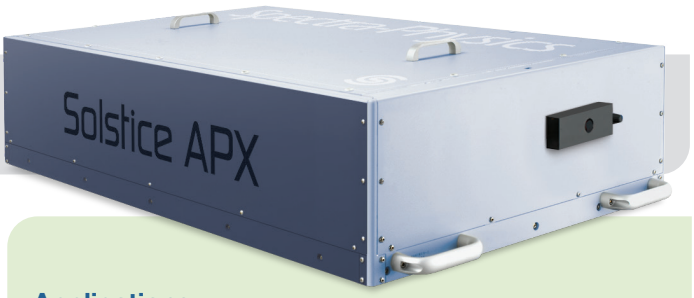
Solstice APX amplifiers incorporate advanced opto-mechanics, industry-proven pump and seed lasers, and a user-friendly interface to deliver a hands-free ultrafast light source with the performance required for demanding applications.

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

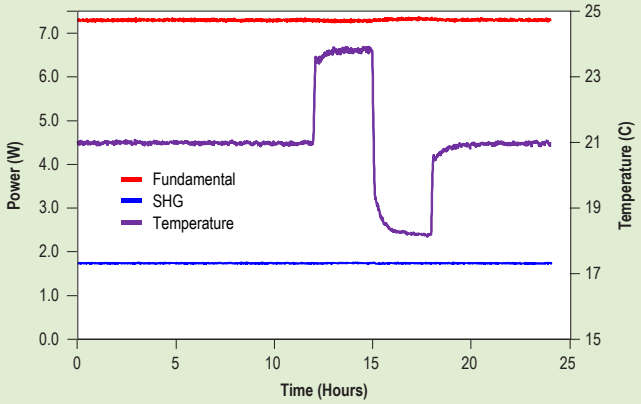
- OPA pumping
- 2D IR spectroscopy
- Ultrafast pump-probe spectroscopy
- Nonlinear optics
- Four wave mixing spectroscopy
- Ultrafast micromachining on a wide variety of materials

Solstice APX Specifications[1, 10]

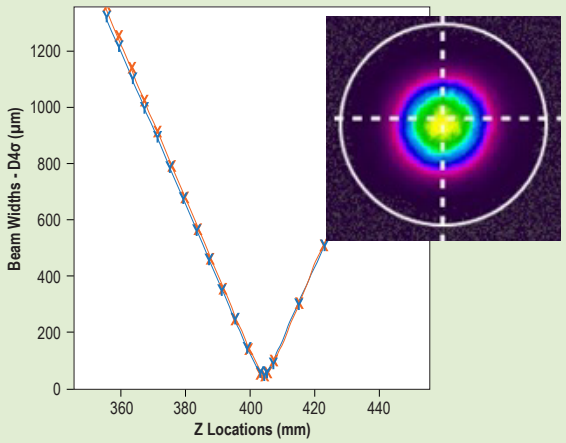
Solstice APX				
Output Characteristics				
Pulse Width[2, 3]		<35 fs – <120 fs		
Repetition Rate[4]		1 kHz	5 kHz	10 kHz
Average Power	Ascend® 60:	>7.0 W	>8.0 W	>7.0 W
	Ascend 40:	>5.0 W	>6.0 W	>5.0 W
Pulse Energy	Ascend 60:	>7.0 mJ	>1.6 mJ	>0.7 mJ
	Ascend 40:	>5.0 mJ	>1.2 mJ	>0.5 mJ
Pre-Pulse Contrast 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)[7] <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/e²)		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. Center wavelength 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 mJ[1]

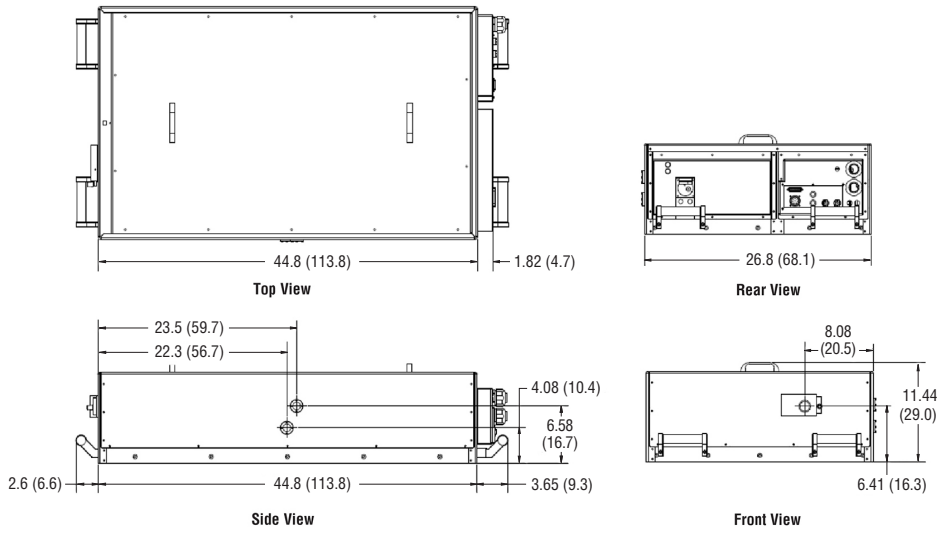


Beam Profile[1]
Solstice APX 1 kHz, 7 mJ[1]



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

Solstice APX Dimensional Drawing



Dimensions in inch (cm)

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