

TOPAS Prime Automated OPA

Hands-Free Wavelength Extension
for Solstice® Ace™ and Spitfire® Ace



The TOPAS Prime optical parametric amplifier (OPA) is a state-of-the-art instrument for Ti:Sapphire amplifier system wavelength extension. Wavelengths can be generated from the deep UV through the infrared (189–18000 nm) range. The TOPAS Prime is computer controlled which minimizes adjustment time of the laser system and maximizes experimental productivity. TOPAS Prime is the ideal instrument for your scientific application.

TOPAS Prime utilizes several key features to maximize utility and efficiency. In the visible range, the fresh pump option provides improved beam quality for more efficient sum-frequency conversion. The improved optical design accommodates a larger beam diameter, (~11 mm) which

eliminates the need for an external telescope. When higher energy output is needed, the TOPAS Prime Plus can accept input energies up to 6 mJ.

The TOPAS Prime works best when pumped using the market leading Solstice Ace and Spitfire Ace regenerative amplifiers. Both amplifiers are equipped with the Spectra-Physics patented Ace regenerative amplifier cavity. This cavity utilizes a normal incidence rod design for outstanding beam quality with minimal astigmatism. In addition, the Solstice Ace and Spitfire Ace provide market leading stability specifications making TOPAS Prime the perfect tool for performing ultrafast research.

The TOPAS Prime Advantage

- Hands-free operation
- Excellent beam quality
- Up to 5 mJ input energy
- High conversion efficiency



TOPAS Prime Specifications^{1, 7}

| | TOPAS Prime |
|--|-------------------------------|
| Input Requirements | |
| Input Wavelength | 770–830 nm |
| Pulse Energy ^{2, 3} | 0.15–6.0 mJ |
| Pulse Width, FWHM TOPAS Prime-U | 20–60 fs |
| Pulse Width, FWHM ⁴ TOPAS Prime-F | 60–150 fs |
| Polarization | Horizontal |
| Energy Stability | 1% rms |
| Pulse-to-Pulse Stability | 1% |
| Beam Divergence | <1.5 x (diffraction limit) |
| Beam Height | 120–185 mm from optical table |
| Beam Diameter (1/e ²) | <11 mm |

| | TOPAS Prime | | |
|---|---|--------------------------------------|--------------|
| Output Requirements | | | |
| Tuning Range | TOPAS Prime-F Output Energy 100 fs | TOPAS Prime-U Output Energy 35 fs | Polarization |
| Signal: 1140–1600 nm | >250 μJ (signal + idler at peak) | >250 μJ (signal + idler at peak) | Vertical |
| Idler: 1600–2600 nm | | | Horizontal |
| SHS: 580–800 nm | >80 μJ | >30 μJ | Horizontal |
| SHI: 800–1160 nm | >50 μJ | >20 μJ | Vertical |
| SFI: 533–600 nm | >50 μJ ⁶ | >30 μJ | Vertical |
| SFS: 475–533 nm | >70 μJ ⁶ | >40 μJ | Vertical |
| FHS: 290–400 nm | >15 μJ | >5 μJ | Horizontal |
| FHI: 400–480 nm | >15 μJ | >4 μJ | Horizontal |
| SH of SFS: 240–266 nm | >7 μJ | >3 μJ | Horizontal |
| SH of SFI: 266–295 nm | >7 μJ | >3 μJ | Horizontal |
| Deep UV - FHS + Pump: 215–240 nm | >3 μJ | >1 μJ | Vertical |
| Deep UV - SH of SFI + Pump: 200–215 nm | >3 μJ | >1 μJ | Vertical |
| Deep UV - SH of SFS + Pump: 190–200 nm | >3 μJ | >1 μJ | Vertical |
| NDFG1K: 2600–4500 nm (100 fs) ⁵ | >8 μJ at 4000 nm | | Horizontal |
| NDFG2K: 4000–18000 nm (100 fs) ⁵ | >4 μJ at 5000 nm >0.3 μJ at 15000 nm | | Horizontal |
| NDFG1K: 2600–4500 nm (35 fs) ⁵ | | >2 μJ at 4000 nm | Horizontal |
| NDFG2K: 4000–15000 nm (35 fs) ⁵ | | >1 μJ at 5000 nm >0.1 μJ at 13000 | Horizontal |

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

2. TOPAS Prime energies scaled linearly with input energy. Energy above generated at 1 mJ input energy.

3. 6 mJ input energy requires TOPAS Prime Plus configuration.

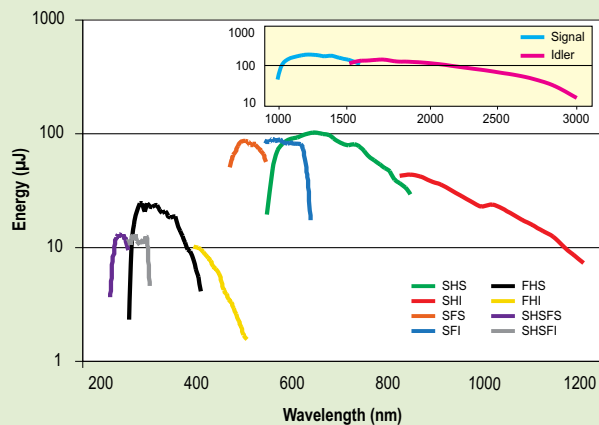
4. For pulse widths >150 fs, contact Spectra-Physics.

5. Collinear DFG available upon request.

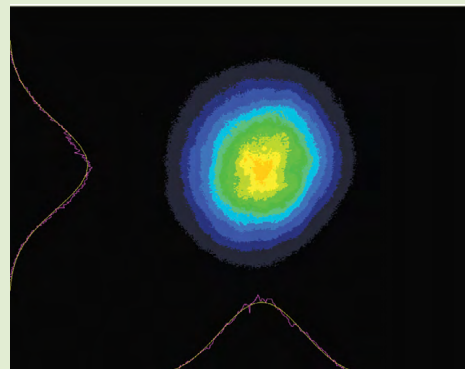
6. Optional fresh pump available.

7. The TOPAS Prime is a Class IV – High Power Laser, whose beam is, by definition, a safety and fire hazard. Take precautions to prevent exposure to the direct and reflected beams. Diffuse as well as specular reflections can cause severe skin or eye damage.

Tuning curves for TOPAS Prime when pumped by 100 fs, 1 mJ Solstice Ace1

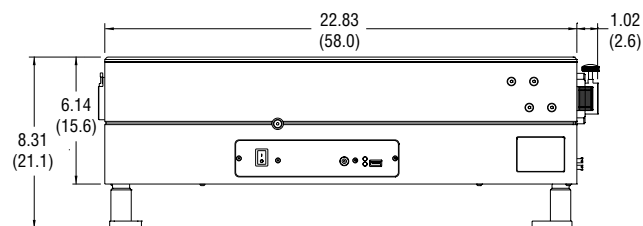


1. Typically measured performance; not a guaranteed or warranted specification.

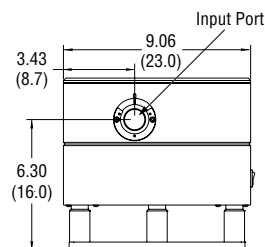


Typical beam profile pumped with Spectra-Physics Ace regenerative amplifier cavity – sum frequency, fresh pump option.

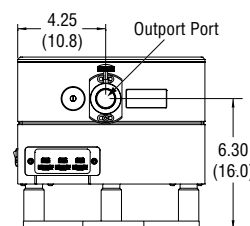
TOPAS Prime Dimensional Drawing



Side View



Input Port View



Output Port View

Dimensions in inch (mm)