

TOPAS



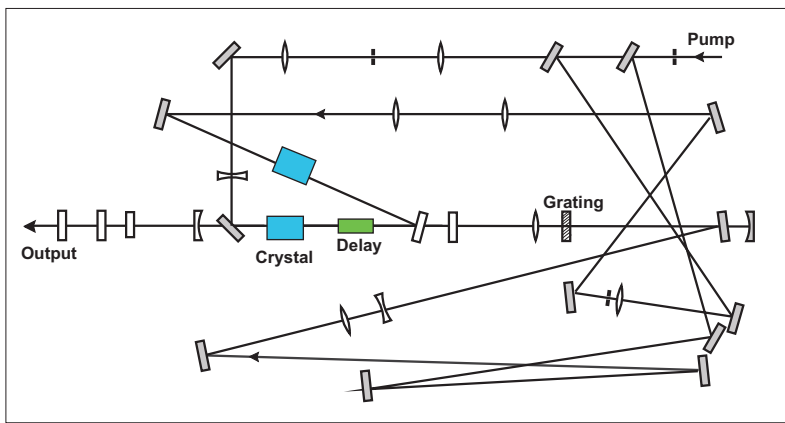
FEATURES

- Travelling wave single crystal, four amplification stage configuration
- Energy conversion into the parametric radiation ~30-35%
- Angular tuning limited by crystal transparency range only
- Grating frequency selector
- Upgradability for pump energy, wavelength and pulse width
- Computer controlled operation
- Optional frequency mixers

TOPAS features the best performance available on the world market during the last years, being the best selling device since 1995. It has attracted much fundamental and technological interest from the very beginning because of the flexibility of its optical scheme, extremely large tuning range, and the possibility of scaling up to a high-power output. TOPAS can be easily adopted to be driven by a variety of laser systems, with pulse widths ranging from 20 fs to 50 ps.

The tuning range of TOPAS is restricted mainly by the pump wavelength and IR-absorption edge of the particular nonlinear crystal (BBO or LBO). This range is notably extended by the frequency up- and down-conversion of the TOPAS output. Different frequency mixing schemes allow for continuous tuning across the whole accessible wavelength range and for generation of several synchronous pulses at different wavelengths.

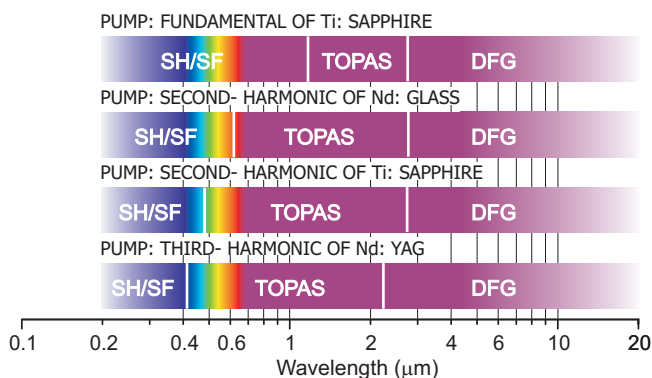
The operation of TOPAS has been tested when pumped with 200-fs and 1-ps second-harmonic pulses of Nd:glass laser, 8-30 ps third-harmonic pulses of Nd:YAG laser, 20-fs to 5-ps fundamental and 0.5-3 ps second-harmonic pulses of Ti:sapphire laser. In all the cases energy conversion into the parametric radiation up to 20-40% was achieved. An important feature of TOPAS design is that it can be matched to pump sources with peak power ranging over orders of magnitude. The minimum 150 fs pump pulse energy ensuring > 15% parametric conversion is around 80 μ J. There are no limitations for pulse repetition rate up to several kilohertz.



TOPAS consists of an independently pumped superfluorescence generator, two preamplifiers, and power amplifier. All these stages are geometrically arranged using a single nonlinear crystal. The seed signal is produced in low-energy preamplifiers, that are optimized for the best spectral and spatial filtering properties. The power amplifier uses >90% of the pump energy and is adjusted for high conversion efficiency along with the beam quality and duration of the converted pulses.

To achieve high reproducibility of generated pulses, all the amplification stages are driven to saturation. At each stage, the pump energies and intensities are adjusted for the particular pump pulse width and power used.

TYPICAL TUNING OF TOPAS PUMPED BY DIFFERENT LASER SOURCES



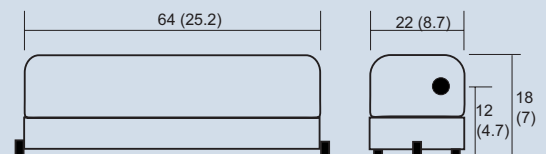
Model	Pump source	Wavelength (nm)
355	Frequency-trippled Nd:YAG	355
400	Frequency-doubled Ti:sapphire	385-405
527	Frequency-doubled Nd:glass	527
800	Ti:sapphire	770-810

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DIMENSIONS in cm (inches)



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