

# HE-TOPAS

High energy optical parametric amplifier



## GENERAL DESCRIPTION

High energy TOPAS is an optical parametric amplifier pumped by amplified Ti:sapphire lasers to produce the highest possible pulse energy with tunable output wavelength. HE-TOPAS consists of three crystals based independently phase and time matched amplification stages to provide nearly bandwidth limited output. Thanks to wisely several times folded optical layout, the system is easily reconfigurable for different pump pulse parameters. Also, inspection and adjustment of the system are easy to perform: each consecutive amplification stage is unbound from the

## FEATURES

- Travelling wave three amplification stages white light seeded OPA
- Pump energy of up to 80 mJ
- Energy conversion into the parametric radiation up to 45%
- Continuously wavelength tunable in 190 nm – 20  $\mu$ m range
- Adaptable to different pump pulse energy, repetition rate and pulse duration
- Computer control via USB port and dedicated software

## APPLICATIONS

- Higher harmonics generation
- CEP locked near-IR pulses
- Time-resolved spectroscopy
- Nonlinear optics

previous stage in terms of beam position/direction. Low dispersion power amplification stage ensures the shortest output pulses available right at the output port of HE-TOPAS. White light is used as the seed for the first amplification stage of HE-TOPAS providing the highest possible pulse-to-pulse stability of amplified pulses. In addition to broad tunability of the system the users are also provided with passively CEP locked near-IR output pulses in 1600–2600 nm range even when the HE-TOPAS is pumped with non-CEP locked pulses from the amplifier.

New monolithic housing of the OPA ensures mechanical robustness and minimal environmental sensitivity of the system. Internal volume divider and two covers separate power-amplification stage from the previous two minimizing air turbulence inside the housing. For extremely high input power levels HE-TOPAS is equipped with water cooled beam dumps to reduce heating effect to the system's performance.

HE-TOPAS can accept pump pulse energies as high as 20 mJ @ 20–30 fs and 80 mJ @ 100–200 fs and produce tunable IR pulses of up to several millijoule of energy. With a number of ~30 systems sold in the world market HE-TOPAS has become a leader and a new standard for high energy OPA.

A few options are offered to extend the tuning range of the system to VIS-UV and mid-IR ranges: separate standing frequency mixer stages or NirUVis – housing integrated harmonics/sum-frequencies generation and wavelength separation unit, HE-NDFG – non-collinear difference frequency generator to extend the tunability of the system up to 20  $\mu$ m in background-free output pulses.

**SPECIFICATIONS FOR 800 nm, 10 mJ, GAUSSIAN BEAM PUMP AT 1 kHz**

**Output from HE-TOPAS Signal and Idler version**

Specification	20–60 fs pump	60–200 fs pump
Signal & Idler tuning range	1140–2600 nm	1140–2600 nm
Energy (Signal + Idler)	>2500 μJ at peak	>2500 μJ at peak
Output pulse duration	(1.2–1.5) × pump pulse width	(0.7–1.0) × pump pulse width
Time-bandwidth product	<1	<1

**Output energy from optional wavelength extension unit NirUVis**

Extension tuning range and interaction	20–60 fs pump	60–200 fs pump
570–1140 nm, SH of Signal (SHS), SH of Idler (SHI)	>450 μJ at peak	>700 μJ at peak
533–580 nm, Pump + Idler (SFI)	>350 μJ at peak	>550 μJ at peak
470–533 nm, Pump + Signal (SFS)	>500 μJ at peak	>800 μJ at peak
285–480 nm, SH of SHS (FHS) and SH of SHI (FHI)	>50 μJ at peak	>150 μJ at peak
240–295 nm, SH of SFS (SHSFS) and SH of SFI (SHSFI)	>40 μJ at peak	>100 μJ at peak
189–240 nm, SF of Pump + UV range, Deep UV option	Contact <i>Light Conversion</i>	

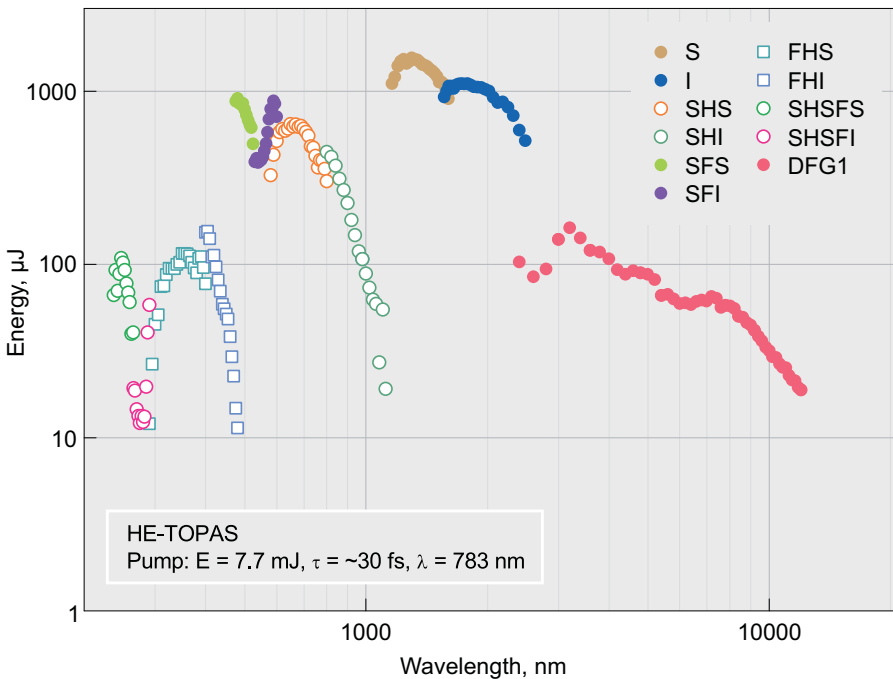
**Output from optional wavelength extension unit HE-NDFG**

Specification	20–60 fs pump	60–200 fs pump
NDFG1 tuning range	3–8 μm	2.4–11 μm
NDFG1 output energy	>40 μJ at 4 μm	>80 μJ at 4 μm
NDFG2 tuning range	5–14 μm	4–20 μm
NDFG2 output energy	>10 μJ at 10 μm	>30 μJ at 10 μm

Note 1: Different pump pulse duration and wavelength would affect the specifications.

Note 2: HE-TOPAS output energy scales up linearly in 5–80 mJ range.

Note 3: Requirements for the pump laser: wavelength ~800 nm, pump pulse energy 3–20 mJ @ 20–30 fs and 4–80 mJ @ 100–200 fs.

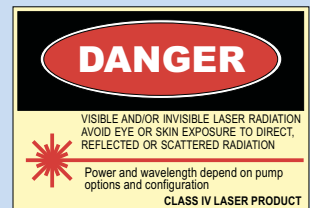


Typical tuning curve of HE-TOPAS with wavelength extensions

**DIMENSIONS**

	W × L × H
General dimension of the housing	450 × 600 × 156 mm
NirUVis housing dimensions	230 × 650 × 156 mm
HE-NDFG housing dimensions	230 × 330 × 156 mm

**PHOTO TECHNICA** PHOTOTECHNICA CORP.  
 TEL:048-871-0067 FAX:048-871-0068,  
 e-mail: voc@phototechnica.co.jp  
 http://www.phototechnica.co.jp



Specifications are subject to change without notice.



MGF "Sviesos konversija"  
 (Light Conversion)  
 Sauletekio av. 10  
 LT-10223 Vilnius, Lithuania  
 Phone: +370 5 2491830  
 Fax: +370 5 2698723  
 e-mail: company@lightcon.com  
 http://www.lightcon.com