

Tuesday, 4 May 2021, 16:00 CEST

EPIC Members New Product Release

Moonlander HHG - a full pump-probe suite for ARPES



Robert Riedel
CEO and Founder

Supported by



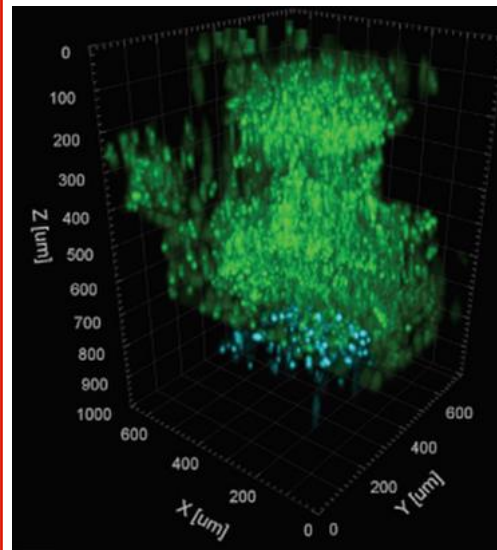
EPIC
European Photonics
Industry Consortium

Extreme power at extreme wavelengths

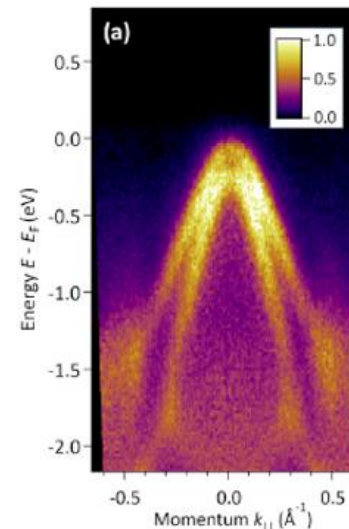


- Ultrafast, high-power laser products
- Outstanding performance and reliability
- OPCPA key to tunable femtosecond pulses at extreme power

Bio-imaging



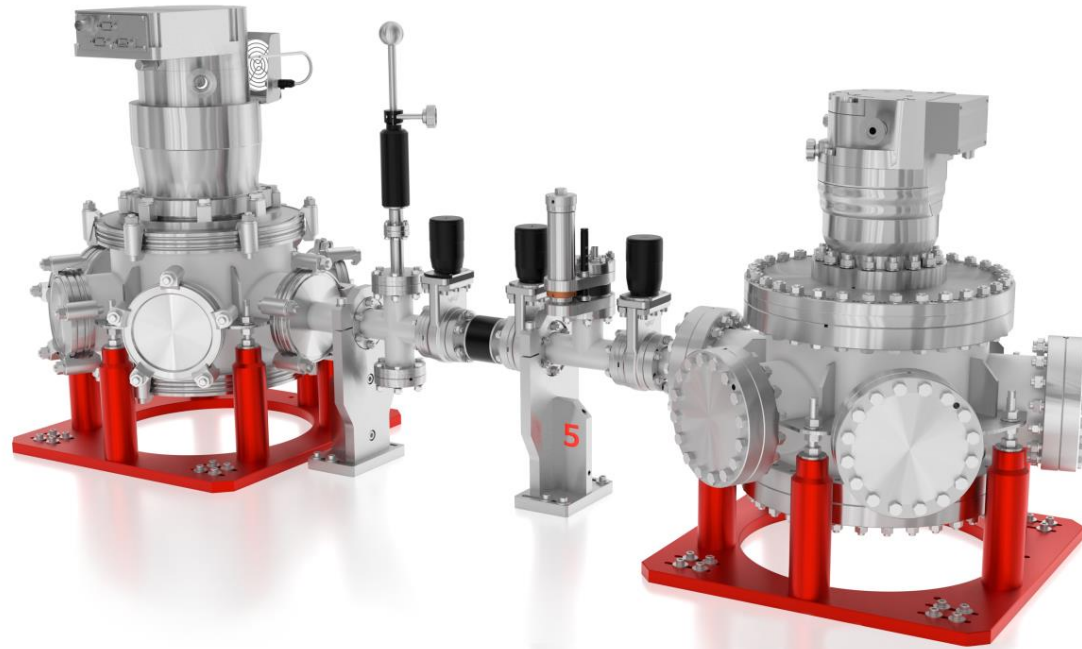
Ultrafast science



EUV/soft-X-ray

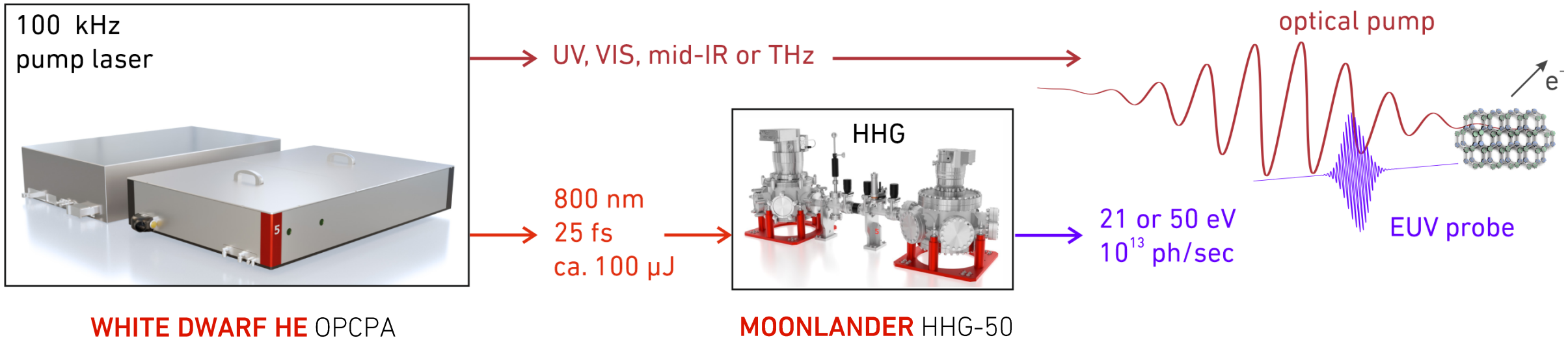


MOONLANDER HHG-50



- High-flux coherent EUV source from 21 to 50 eV
- Applications: Photo-electron spectroscopy (PES), time-resolved ARPES, XUV spectroscopy, coherent diffractive imaging
- Robust and reliable design for user-friendly operation
- Benefit: Full pump-probe suite in combination with our OPCPA technology

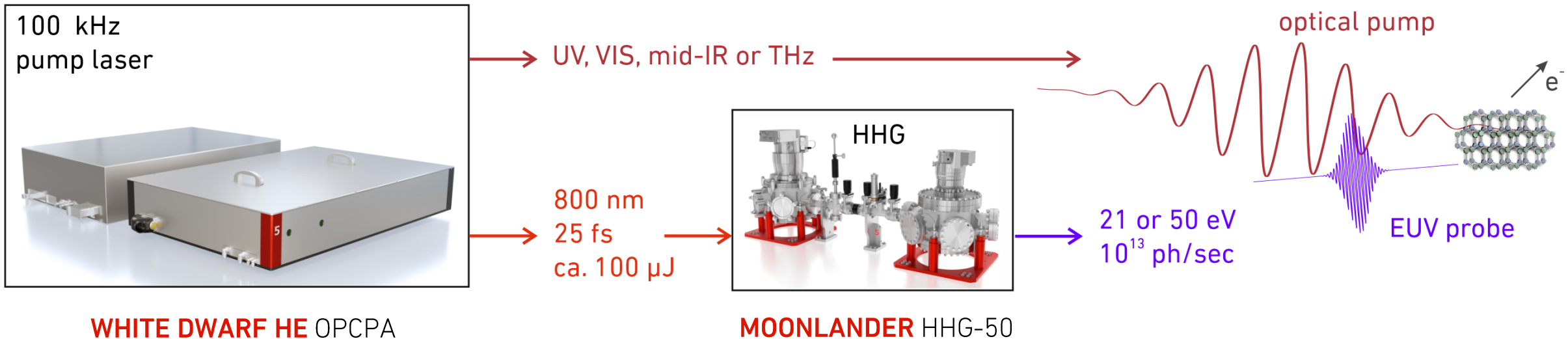
Example full pump-probe suite



Example full pump-probe suite

OPCPA system

- Ultrashort pulses at high power
- Excellent temporal contrast
- Robustness & upgradability



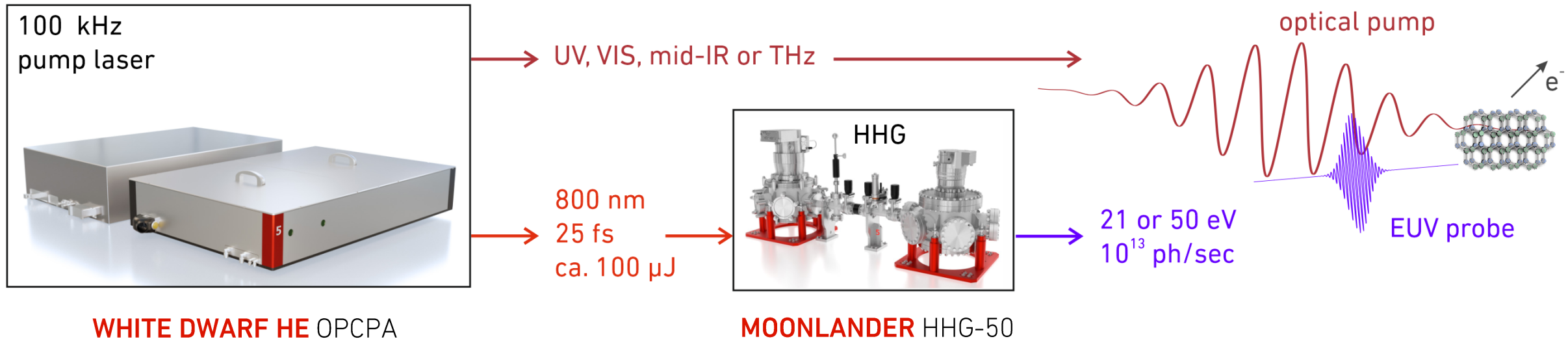
Example full pump-probe suite

OPCPA benefits for HHG

- Ultrashort pulses at high power
- Excellent temporal contrast
- Robustness & upgradability

HHG source benefits

- High repetition rate at high flux: $> 10^{13}$ ph/sec (at source) at 100 kHz
- Better measurement sensitivity and faster acquisition rate
- Tunable harmonics



Thank you for your attention




MOONLANDER HHG-50



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class5photonics.com

 YouTube



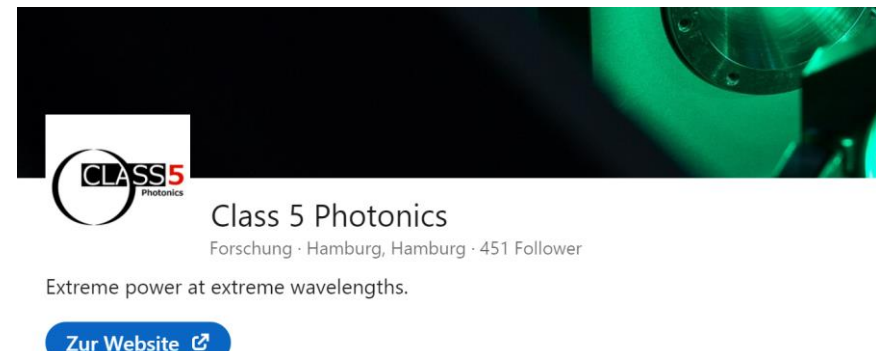
- Ultra-short pulses
 - < 10 fs ... 100 fs
 - UV ... mid-IR
- High-power and high repetition rate
 - 100 W
 - 100 kHz ... MHz
- Stability and robustness
 - passive amplifier
 - no extensive cooling
 - compact



 Twitter



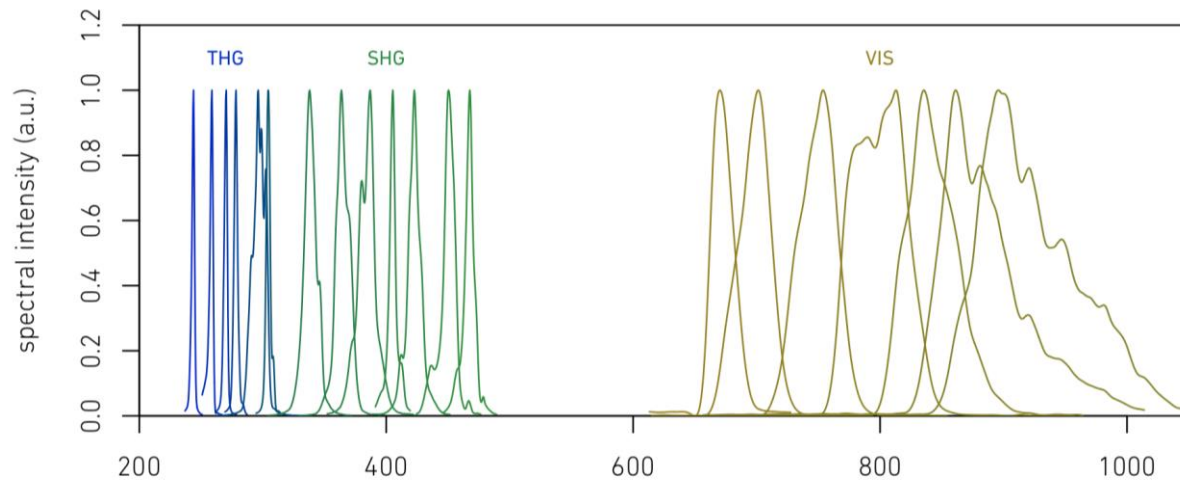
 LinkedIn



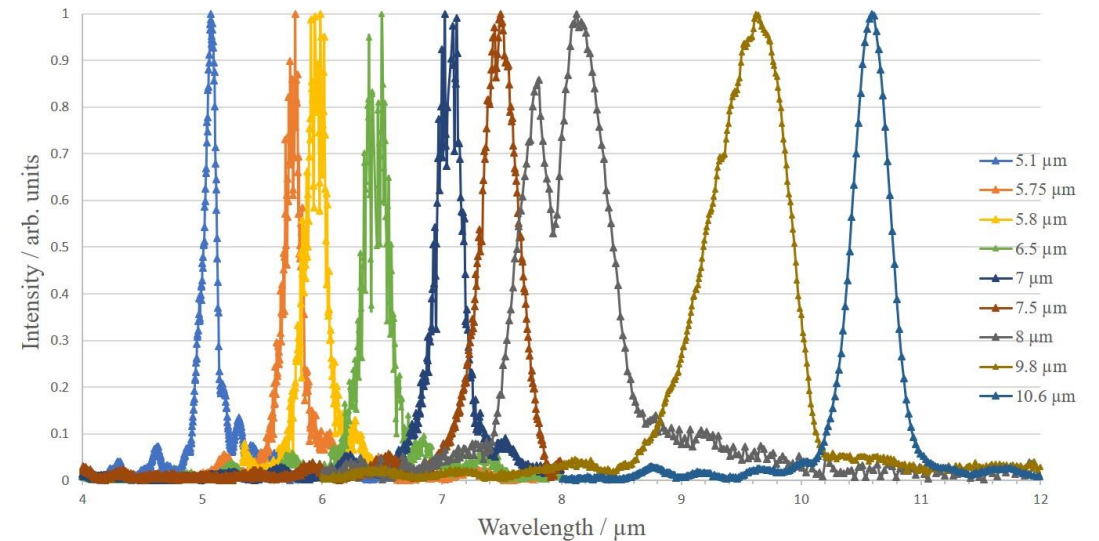
Extra slides

Optical pump options

UV to VIS pump



MIR pump

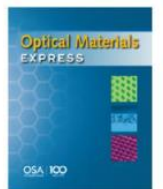


Dual channel laser system with gap-less tuning from 250-1300 nm at megahertz repetition rates for time-resolved photoelectron-emission microscopy and spectroscopy," Proc. SPIE 11264, Nonlinear Frequency Generation and Conversion: Materials and Devices XIX, 1126415 (2 March 2020); <https://doi.org/10.1117/12.2546247>



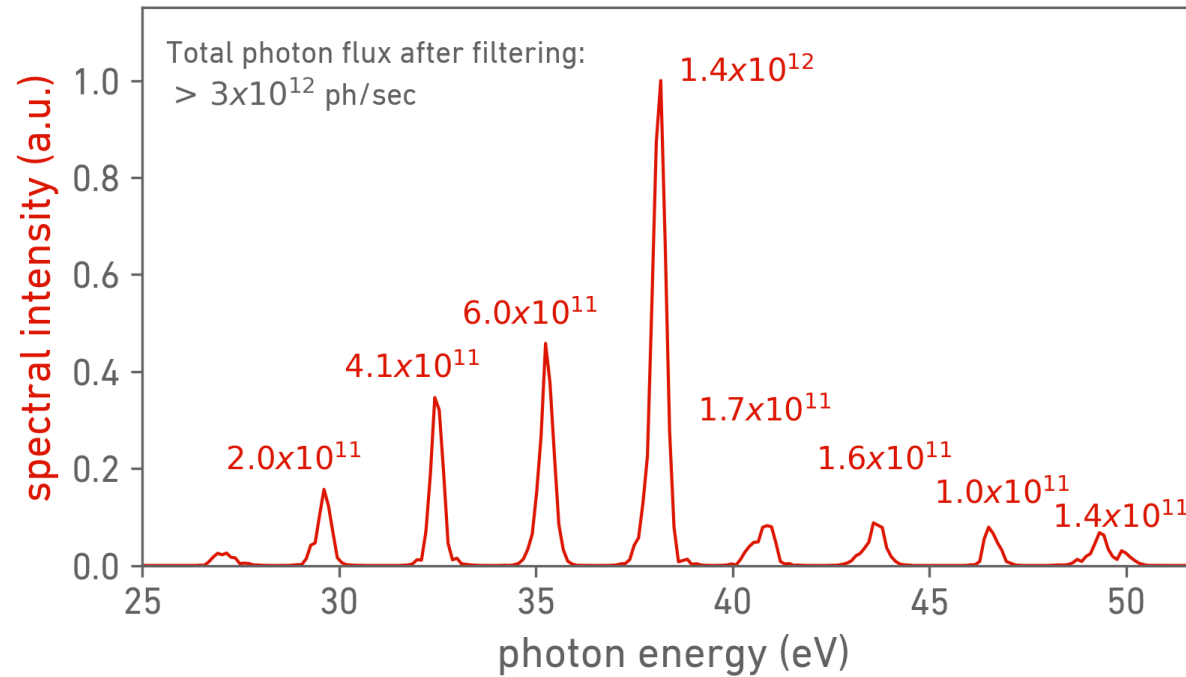
Optical properties of Li-based nonlinear crystals for high power mid-IR OPCPA pumped at 1 μm under realistic operational conditions

Mahesh Nambodiri, Cheng Luo, Gregor Indorf, Torsten Golz, Ivanka Grguraš, Jan H. Buss, Michael Schulz, Robert Riedel, Mark J. Prandolini, and Tim Laarmann



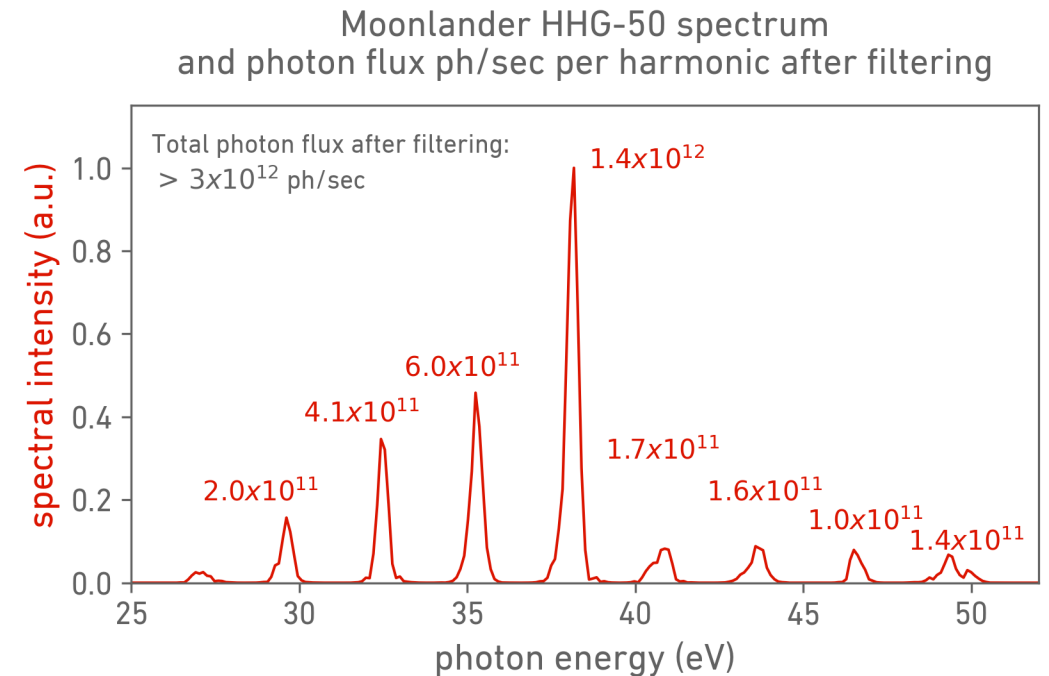
XUV probe based on Moonlander HHG

Moonlander HHG-50 spectrum
and photon flux ph/sec per harmonic after filtering

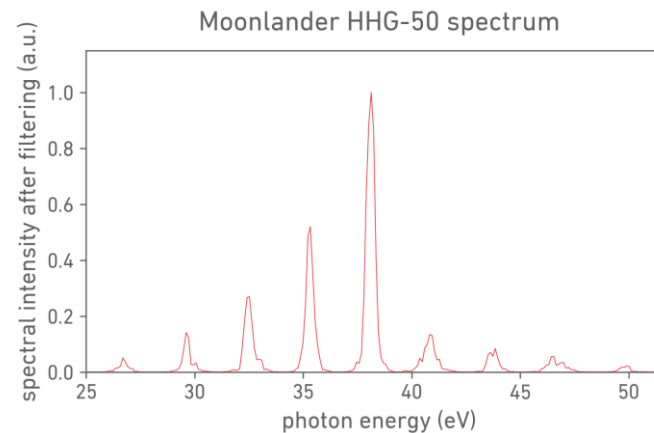
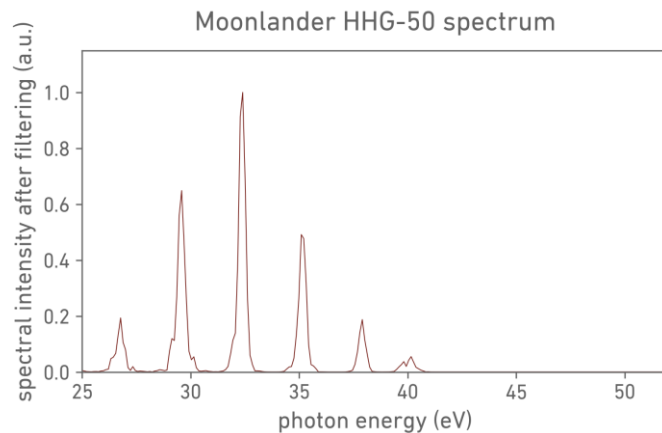
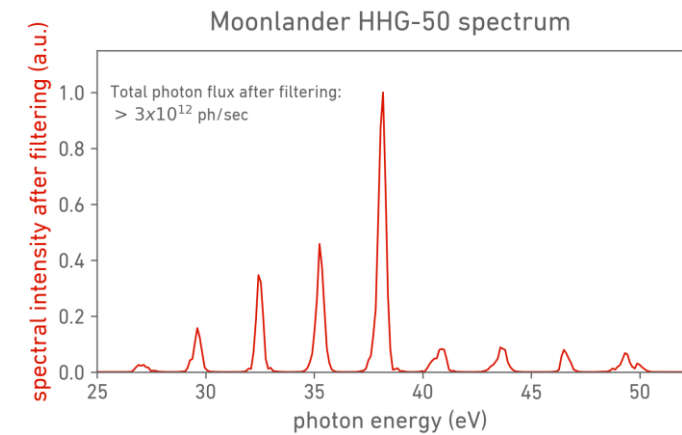
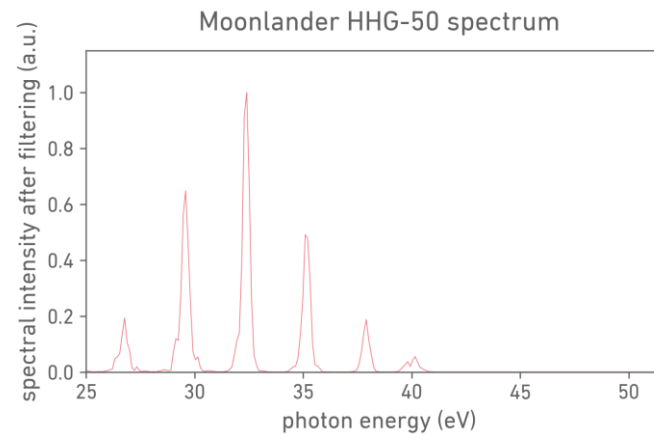
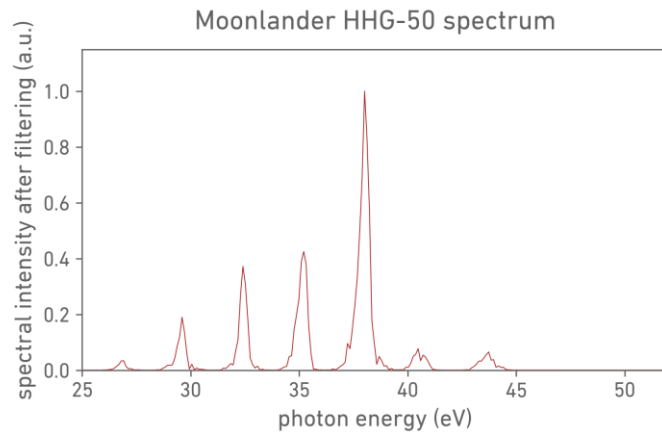


Moonlander HHG-50

Driver inclusive	White Dwarf HE OPCPA at 400 nm or 800 nm
Photon energy	21...50 eV
Wavelength	24...59 nm
Spectral bandwidth (FWHM)	ca 100 meV depending on driver
Photon flux at source	$> 5 \times 10^{12}$ ph/sec @ 38 eV
Photon flux filtered (single-harmonic)	$> 1 \times 10^{12}$ ph/sec @ 38 eV
Repetition rate	100 kHz, higher on request
Focusing and steering	on request
Full pump-probe suite	optionally based on White Dwarf HE OPCPA
User interface	motor control for target position and target camera, remote gas pressure control, diode for EUV flux measurement



Moonlander HHG-50 – gas pressure scans



Spectral intensity of the Moonlander HHG source at different gas pressures. The spectral intensity can be optimized by varying the gas pressure.

Benefits

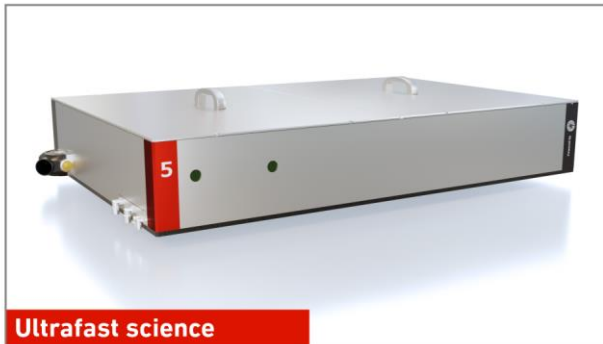
- Full pump-probe suite available based on White Dwarf HE OPCPA with intrinsic synchronization
- High flux at 100 kHz or more, providing 21-50 eV photon energy with optional filtering and focusing
- Specially designed for ARPES and CDI

Our OPCPA products

WHITE DWARF OPCPA 5 W

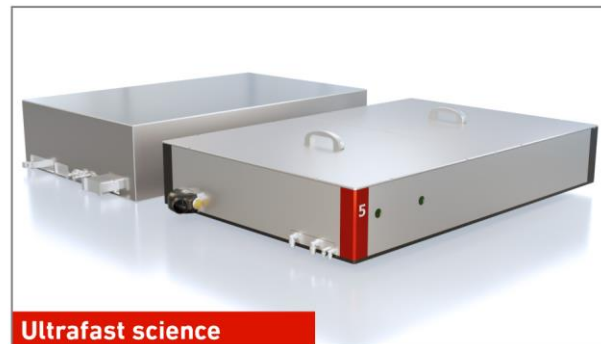
for few-cycle pulses

- 800, 1550 or 2000 nm
- < 10 fs



WHITE DWARF HE OPCPA 30 W

- 800, 1550, 2000 or 3000 nm
- < 10 fs
- CEP stability and pump-probe



SUPERNOVA OPCPA 100 W

our flagship product

- 800, 1550, 2000 or 3000 nm
- < 10 fs
- CEP stability

