

Moonlander HHG – high harmonic beamlines and sources for EUV applications

EUV source & pump-probe suite

- 21-50 eV photon energy with optional filtering and focusing
- full pump-probe suite available
- 100 kHz, 200 kHz, 1 MHz rep rate version available
- designed for ARPES and CDI



High photon flux at high repetition rate

The Moonlander HHG is an efficient coherent EUV source for time-resolved spectroscopy such as ARPES.

Driven by our high-power laser technology, the Moonlander HHG provides high photon flux at high repetition rates in a compact and robust design.

A second, synchronized optical output from UV to mid-IR can be provided with a tunable OPCPA, hence offering a full pump-probe suite to take the next step in time-resolved photoelectron spectroscopy.

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Features

High-flux high harmonic generation source

up to 60 μ W at 20 – 60 eV other spectral ranges on request

Complete VIS-pump / EUV-probe suite

Combine the Moonlander HHG source with a tunable OPCPA for intrinsically synchronized pump-probe experiments

Convenient user interface

Software-control and diagnostics for target position, gas pressure and photon flux

Custom beamline components

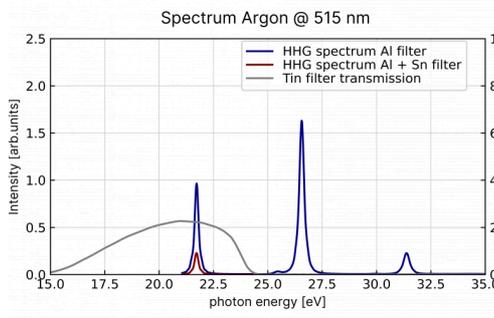
add monochromators, focusing and beam steering units, differential pressure stages, or customized experimental chambers

Specs

CLASS 5

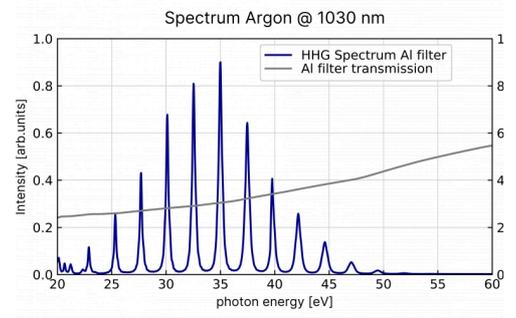
	Moonlander HHG-21	Moonlander HHG-21 HR	Moonlander HHG-50
Photon energy	21 eV	21.7 eV	21...50 eV
Wavelength	59 nm	59 nm	24...59 nm
Spectral bandwidth <small>FWHM</small>	80 meV	20 meV	200 meV
Photon flux at source <small>single harmonic</small>	$> 1 \times 10^{13}$ ph/sec	$> 1 \times 10^{13}$ ph/sec	$> 3 \times 10^{12}$ ph/sec @ 38 eV
Photon flux at focus <small>single harmonic</small>	$> 1 \times 10^{11}$ ph/sec	$> 1 \times 10^{11}$ ph/sec	$> 1 \times 10^{12}$ ph/sec
Repetition rate	200 kHz	1 MHz	100 kHz
Focusing and steering	optional	optional	optional
Optical pump and recombination at sample chamber	350 nm – 15 μ m (optional)	350 nm – 15 μ m (optional)	350 nm – 15 μ m (optional)
Driver laser	included	included	included

Performance



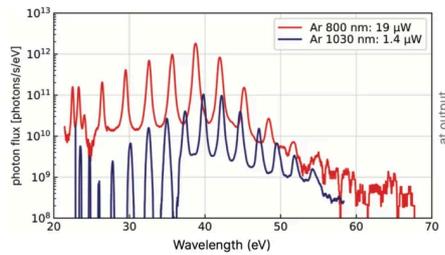
XUV spectrum of the Moonlander HHG-22 in ARPES mode

Three distinct, narrow-band harmonic peaks are generated using Argon gas. The maximum at 21.7 nm can be spectrally isolated using a transmissive tin filter, which acts as band-pass filter in the Moonlander. For the other wavelengths we offer multi-layer filtering

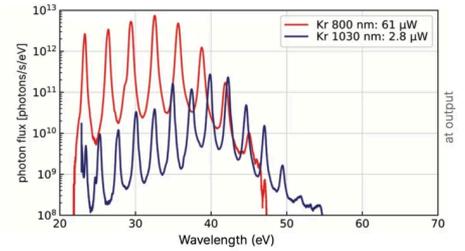


XUV spectrum of the unfiltered Moonlander HHG-35.

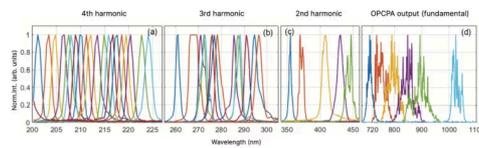
Many high order harmonics of the 1030 nm driving field are generated using Argon gas. The spectral peaks reach from 22 eV up to 52 eV. The large spectral coverage covering the valence electronic states of most chemical compounds can be employed in XUV reflection and transmission spectroscopy with femtosecond time resolution to unravel chemical processes on their natural time scale.



Photon flux Argon



Photon flux Krypton



Optical pump options

Applications

- Material science & photo-electron spectroscopy.
- Attosecond science
- Time-resolved ARPES
- Attosecond dynamics in solids and gases
- Inspection in EUV
- Ultrafast material science
- Nanoparticles and clusters
- Bioparticle imaging