

XUV BEAM LINES

Sources of short-wavelength radiation, such as synchrotrons or free electron lasers, have already enabled numerous applications and will facilitate more seminal studies. On the other hand, sources of coherent extreme ultraviolet to soft x-ray radiation via high-harmonic generation (HHG) of ultrashort-pulse lasers have gained significant attention in the last years due to their enormous potential to address a plethora of applications in a cost-effective and table-top format. Therefore, they constitute a complementary source to large-scale facilities. The photon flux values obtained by fiber laser driven HHG sources can be considered

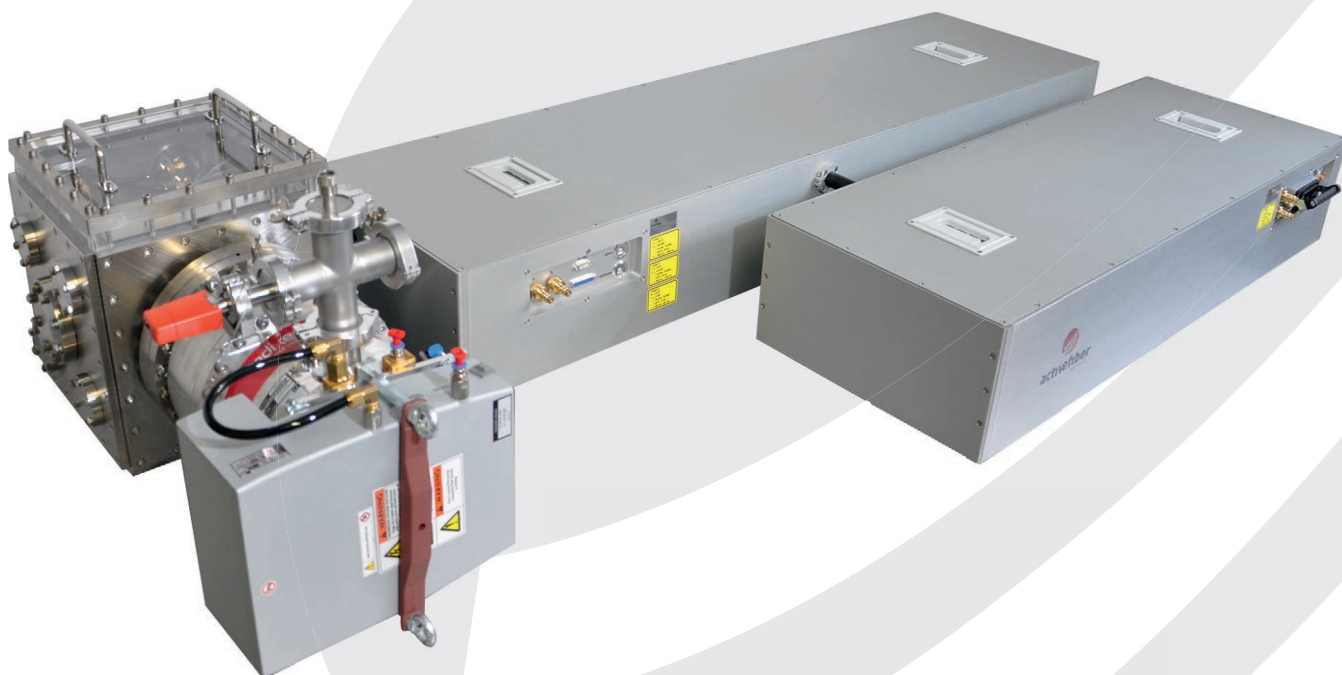
the highest of all laser systems for photon energies between 20-150 eV.

AFS ultrafast fiber lasers are ideal high-harmonic drivers. These turnkey HHG beamlines can address several applications in the EUV to soft-X-ray spectral region such as:

- Photoelectron spectroscopy
- Coherent diffractive imaging – CDI (nanoscope)
- Attosecond science

MORE INFORMATION

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High-flux HHG beam line driven by an AFS fiber-laser system

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Photon energy	21 eV	26 eV	68 eV
Wavelength	59 nm	48 nm	18 nm
Photon flux per harmonic	up to 10^4 s^{-1}	up to 10^2 s^{-1}	up to $4 \cdot 10^{11} \text{ s}^{-1}$
Average power per harmonic	up to 500 μW	up to 4 μW	up to 1 μW
Repetition rate	flexible, up to 10 MHz		
Pulse duration	The pulse duration is smaller than the laser pulse duration i.e. $< 30 \text{ fs}$ (or shorter)		
Relative bandwidth of one harmonic	$< 10^{-2}$	$< 2 \cdot 10^{-3}$	$< 5 \cdot 10^{-3}$
Beam profile	Gaussian		
Dimensions of HHG chamber	$80 \times 40 \times 40 \text{ cm}^3$		
Additional features	Turnkey reliability, high stability, all parameters software-controlled		
Options	Single harmonic selection, separation of XUV radiation and IR laser		

Performance examples of AFS' XUV beam lines

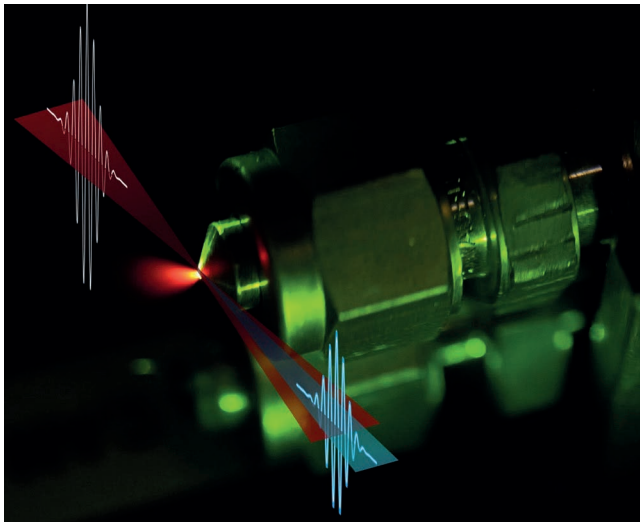
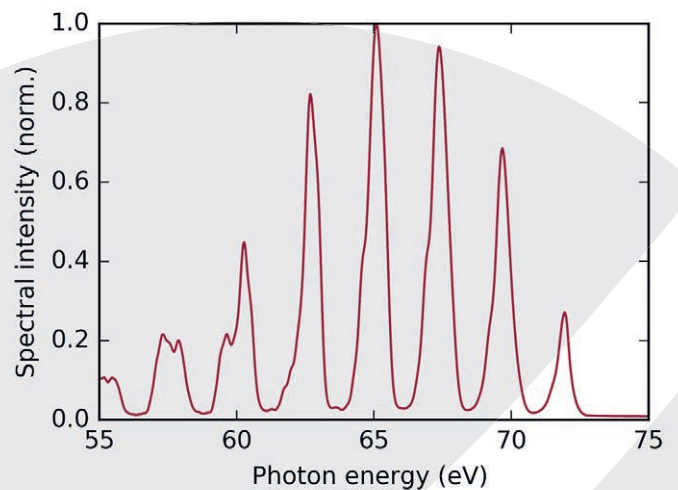


Illustration of the HHG process



Typical emission spectrum of a fiber laser driven HHG source