

## HIGH-FLUX **XUV** BEAMLINES

Sources of short-wavelength radiation, such as synchrotrons or free-electron lasers, have already enabled numerous applications and will facilitate more seminal studies. Furthermore, 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 20eV – 150 eV.

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

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



### **MORE INFORMATION**

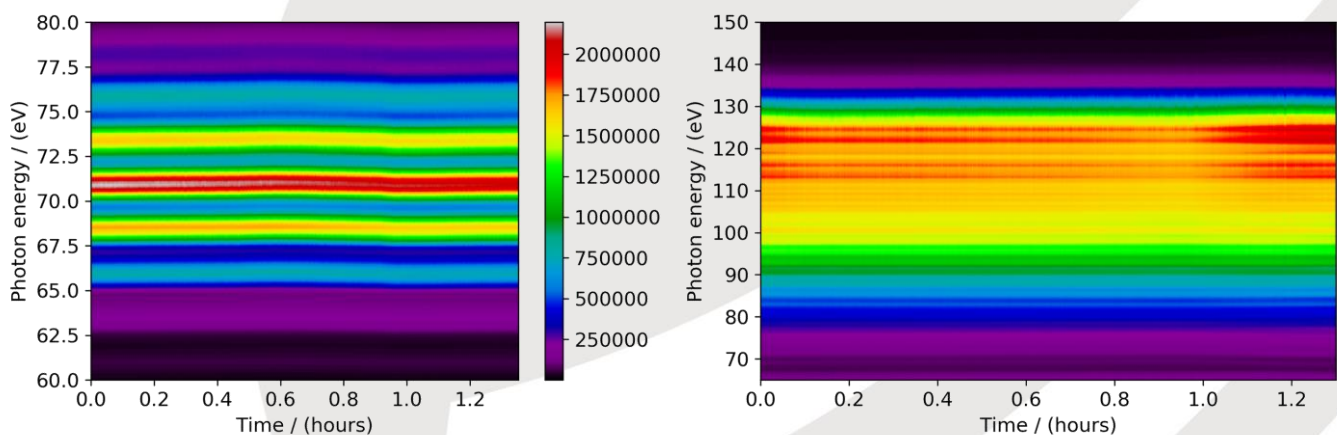
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|                            | Accessible parameter ranges  | Possible Addon Modules   |
|----------------------------|--|--|
| Photon energy              | 20eV ... >150eV  | <b>Monochromization:</b><br>Pick the harmonic you want. Can be adjustable to pick multiple different lines   |
| Wavelength                 | 60nm ... <8.5nm  |  |
| Photon flux per harmonic   | up to $10^{15}$ Photons/s/harmonic (depending on harmonic)                             | <b>Dual color driver:</b><br>Generate harmonics with multiple driving laser wavelengths (e.g. 1030nm & 515nm) at the same time or switch between both drivers during an experiment on the same optical path        |
| Average power per harmonic | up to 10mW (depending on harmonic)   |  |
| Repetition rate            | flexible, up to 10 MHz   | <b>Focusing:</b><br>Our radiation has an excellent beam quality and can be focussed as tightly as needed. Down to a few $\mu\text{m}$ have been realized.  |
| Pulse duration             | Shorter than pulse duration of input laser pulse i.e. <30fs (or shorter)               |  |
| Spectral bandwidth         | can remain close to the transform limit with flexible bandwidths (i.e. down to <10meV) | <b>Differential pumping</b><br>Target chambers often have strict requirements on the pressure. We can use the focusing section of the beamline to reduce the pressure down to <math>10^9\text{mbar}</math> or less |
| Beam profile               | Gaussian   |  |
| Dimensions of HHG chamber  | 80cm $\times$ 40cm $\times$ 40cm   | <b>Spectrometer</b><br>Since it is always helpful to know the exact spectrum during your experiments, we offer integrated modules to measure the spectrum, even simultaneously to your experiment, if desired.     |
| Vacuum connections         | typically KF-40, can be adapted to customer preferences                                |  |
| Additional features        | Turnkey reliability, high stability, all parameters software-controlled                |  |

The specs above show all our capabilities. Please inquiry for detailed specifications tailored to your application.



Exemplary long-term measurements for harmonic spectra centered around 70eV (left) and 120eV (right).