Brief description of the High-order Harmonic Generation (HHG) beamline

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High-order harmonic generation in gas is employed to produce a stable source of coherent femtosecond pulses in the XUV spectral range. For call 2 the source is set to a 5 m focal length and is prepared to run with different noble gases with conversion efficiencies up to 5 x 10^{-6} for argon. The XUV beamline is equipped with a set of diagnostics including a Flat field XUV spectrometer, a calibrated XUV diode, and a wavefront sensor for characterization of the beam provided to the end-station.

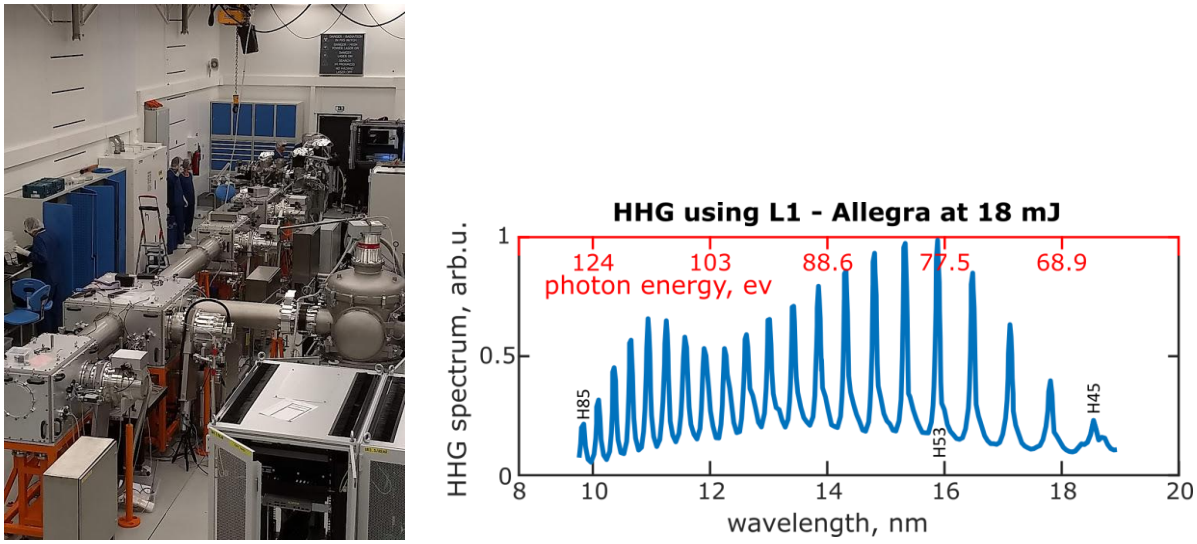

Fig 1: Left: Picture of the ELI Beamlines HHG source. Right: Harmonics generated by L1 ALLEGRA in the E1 HHG source (neon cell at 80 mbar).

XUV Monochromator and focusing

For call 2 experiments two HHG beamline configurations are available. Either using a grating monochromator and an ellipsoidal mirror reimaging the output slit of the monochromator, or bypassing the monochromator and using a mulitlayer spherical mirror to focus the HHG beam. Focusing geometries and their detailed properties are introduced in the document MAC_2021. The grating monochromator provides an energy resolution of < 1 eV, sufficient to separate adjacent harmonics in its region of operation (10 to 120 eV). The HHG beamline is described in more detail in [1].

Tab. 1: XUV monochromator properties

Pulse duration after monochromator (simulated)	**Grating (lines/mm)/spectral region (eV)**	**Throughput**	**Refocusing**
35 to 100 fs	Flat mirror G1 (86) / 10-28 G2 (158) / 25-54 G3 (600) / 51-98 G4 (985) / 86-121	>30% between 15th and 29th harmonic	5:1 ellipsoidal mirror. Spot size about 40*70 um

References

[1] High-flux source of coherent XUV pulses for user applications
O. Hort, et al., Optics express 27 (6), 8871-8883 (2019)