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Mechanical design and implementation of a High Harmonic Generation source at the SXP instrument

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The Time-Resolved X-Ray Photoelectron Spectroscopy (TR-XPES) experimental station at the Soft X-ray Port - SXP Scientific Instrument of the European XFEL has been developed to perform femtosecond time-resolved photoelectron spectroscopy experiments on solids. The SXP Scientific Instrument opens new scientific opportunities for fs TR-XPES, including core level photoelectron spectroscopy (XPS), photoelectron diffraction in forward scattering (XPD), and increased probing depth through higher electron kinetic energies. To further extend experimental capabilities, a laser-based High Harmonic Generation (HHG) source is under development. HHG pulses in the extreme ultraviolet (XUV) range up to 70 eV will be generated using a 1030 nm pump laser with 200 μ J pulse energy at a nominal 334 kHz repetition rate. This photon energy range will enable to perform measurements more surface sensitive and allow to study of shallow core levels with high fidelity and the measurement of valence band dispersion with high angular precision. This contribution describes the mechanical design, key technological developments, implementation, and current status of the HHG source at the SXP Instrument.

Footnotes

Funding Agency

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