Seminarankündigung

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“Optics for photon handling and beam conditioning in extreme-ultraviolet ultrafast beamlines”

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Abstract:

The main topics related to optical components for table-top ultrafast beamlines with femtosecond or sub-femtosecond resolution for the generation and use of high-order laser harmonics are here discussed. After the generation through laser-gas interaction, the extreme-ultraviolet (XUV) photon beam has to be conditioned and handled. The presentation is focused on three main issues presently under development: 1) monochromatization; 2) focusing; 3) polarization.

The available techniques to realize XUV ultrafast tunable monochromators using diffraction gratings are discussed. The main issue to be faced when designing a monochromator is the preservation of the ultrashort duration of the pulse after the monochromatization. The different available grating geometries and some recent realizations are presented. Monochromatized pulses as short as 5 fs have been recently demonstrated.

The problems related to the design of the focusing section of XUV ultrafast beamlines are discussed. The effects of the focusing properties on the ultrashort duration of the pulse are considered, namely the focal aberrations due to the optical design. Some optical solutions for XUV ultrafast micro-focusing and results measured on existing beamlines are discussed.

Finally, the development activities on broad-band reflection polarizers/polarimeters for the simultaneous measurement of polarization on multiple harmonics are discussed. Ruthenium-coated optics have been realized for improved response in the 50-100 eV energy region. Characterization measurements done at synchrotron beamlines will be discussed.