CFEL SCIENCE

SEMINAR

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CFEL-bldg. 99, seminar room III (EG.080)

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High-power XUV frequency combs

Frequency combs are nowadays routinely used for precision spectroscopy in the visible and near-IR spectral region. In contrast, the extreme ultraviolet (XUV) spectral region presents a barely explored area for precision spectroscopy studies with promising targets such as ground state transitions in helium, highly charged ions and possibly even nuclei. While XUV combs can reach sub-Hz coherence levels [1], the bottleneck is the limited power available in the XUV.

Here we discuss recent steps towards high-power XUV comb generation. These include downscaling of efficient high-order harmonic conversion schemes [2] to adapt for intra-cavity operation as well as the exploration of intracavity plasma dynamics and their suppression. Our recent effort allowed us to generate high harmonics with average power levels in the mW range, setting a new record for XUV combs and more generally, for high-harmonic-based XUV sources.

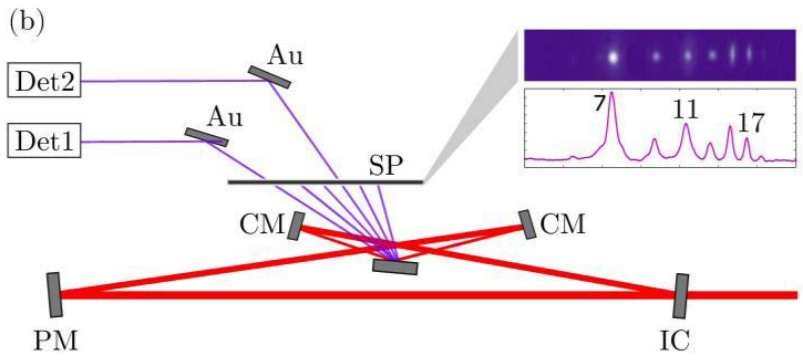

Figure 1: Femtosecond enhancement cavity with input coupler (IC), plane mirror (PM), two curved mirrors (CM), sodium salicylate plate (SP) and two gold mirrors (Au). The harmonics are out-coupled from the cavity via a combined reflector/diffraction grating. Harmonic 11 and 17 are optionally sent through apertures in the SP to independent detectors (Det1 and 2).

Hosts: Franz Kärtner/Ingmar Hartl