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New opportunities for THz-XUV pump-probe experiments after upgrading the FEL at Hamburg (FLASH)

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FLASH at DESY in Hamburg has a unique FEL scheme, which includes XUV and THz undulators, providing soft X-Ray and intense tunable THz pulses at a high repetition rate simultaneously with low jitter [1]. The combination of XUV and THz pulses at FLASH enables time-resolved pump-probe experiments to study structural and electron dynamics of molecules[2,3], coherent control of magnetization dynamics[4], and study matter at extreme conditions[5]. The THz beam at FLASH1 has its own unique features of intense pulse energies up to 150μJ at high-repetition rates and tunable wavelengths from 300μm (1THz) to 10μm (30THz).

With the upcoming upgrade of the THz beamline within the 2020+ project, FLASH will provide seeded FEL pulses in the range between 3.6 nm –60.9 nm, plus XUV 3rd harmonic reaches O k-edge, in combination with strong THz pulses in the range between 1 THz –30 THz, tunable pump-probe laser and dedicated THz-XUV experimental endstations, opening new opportunities for most challenging ultrafast XUV-THz pump-probe experiments.

References:

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- [4] Liu, X., Jal, E., et al., Investigating Coherent Magnetization Control with Ultrashort THz Pulses. Appl. Sci. 2022, 12, 1323.
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