

CROSS-CORRELATION BETWEEN A VUV-FEL AND AN OPTICAL LASER

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Abstract

At the Free Electron Laser in Hamburg (FLASH) a synchronized 800 nm optical laser is available for time-resolved VUV/vis pump-probe experiments. We crossed both femtosecond pulses in a Kr gas target and imaged the created photoelectrons with an energy-dispersive electron spectrometer. In the region where both pulses overlap in space and time, the photoelectrons are energetically shifted and form spectral sidebands. The imaging electron spectrometer projects the spectral- into an intensity modulation, thus, mapping time into space. This way, the technique delivers information about the relative timing between VUV- and visible pulse and is non invasive for both pulses. While observation of the cross-correlation signal currently requires data-averaging, with proper focussing single shot capability shall be reached, thereby enabling pulse-to-pulse jitter measurements.

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