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Probing THz driven solids by second harmonic generation

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THz sources at FLASH utilize spent electron beam from an soft X-ray FEL to generate very intense (up to 150μJ), tunable frequency (1-300THz) and ultrafast narrow-band (˜10%) THz pulses, which are naturally synchronized to soft X-ray pulses. This unique combination allows for wide range of element specific pump-probe experiments in physics, material science and biology.
THz pulses are completely temporally characterized by a jitter corrected Electro-Optic-Sampling(EOS) THz pulse characterization over a broad spectral range (0.1 - 8 THz).
In this work we report on the installation of new probing technique that enables study changes of material symmetry, by second harmonic generation of the probing fs-laser. Instrument allows detection of 2nd harmonic both in transmission and reflection, allowing probing of bulk and surface effects and matching THz excitation depth, e.g. at and off of absorption resonances. Instrument employs arrival time jitter correction and has temporal resolution better than 10fs.

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