

High-field terahertz laboratory, University of Pécs



Company profile:

Generation and application of terahertz (THz) pulses with high pulse energy, and with extremely high electric field strength that is sufficient for nonlinear THz spectroscopy applications. Searching for new application possibilities in the fields of material-, medical-, and life sciences.

Manipulation, acceleration, focusing and temporal shaping of electrically charged particle bunches (electrons, protons, ions) with THz pulses having extremely large electric field strength. Elaboration of the theory of a possible table-top proton accelerator making possible the use of protons having low energy for hadron therapy applications. Generation of single cycle UV and X-ray radiation with Thomson scattering.

In the frame of ELI (Extreme Light Infrastructure) generation of attosecond light pulses with the method of THz assisted high harmonic generation.

Our results as far as here: Presentation of optimal parameters for design of tilted pulse-front based THz generator scheme. It was shown that in case of using longer wavelength than the typical 800 nm in a tilted pulse-front excitation scheme semiconductors (like ZnTe, GaP) are competitive with LiNbO₃ from the point of view of efficiency. It was shown, that in case of LiNbO₃ the peak THz electric field strength can be increased by more than one order of magnitude using ~500 fs pump pulse length, and cryogenic temperature. With this technique it is possible to generate single cycle THz pulses with pulse energy exceeding 10 mJ, and with peak electric field strength of 100 MV/cm with central frequency about 1 THz.

Fields of cooperation:

- **2D LASER CUTTING**
- **Plastic welding using high power diode laser**

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