

# GFA - PSD Accelerator Seminar

## ***Femtosecond laser-based measurements of THz pulses and relativistic electron bunch shapes at record acquisition rate and sub-picosecond resolution***

**Monday, 19 August 2019, 16.00 h, WBGB/019**

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The latest lightsource generation, such as Free-Electron Lasers and synchrotron radiation facilities, requires challenging optical ultrafast measurements. In particular, there is generally a strong need for characterizing relativistic electron bunch shapes with sub-picosecond to femtosecond resolution. A particularly promising method relies on ultrafast measurement techniques based on the use of chirped laser pulses for probing the electric field created by the electrons either in the near field (in the vicinity of the bunches) or in the far field (i.e. looking at the radiation emitted by the bunches). However, developing such electric field recording techniques present important challenges, given the ultrafast time-scales, the repetition rates (up to hundreds of MHz), as well as the need for single-shot characterization.

We present a new strategy allowing pulses to be recorded in single-shot with picosecond resolution at megahertz acquisition rates. The method is based on a combination of the so-called photonic time-stretch data acquisition allowing long record lengths and novel electro-optic sampling techniques. We will also present a promising strategy to overcome the current time resolution limitation of the existing setup, which requires new ideas from the ultrafast measurements' community.

For more details, contact Eugenio Ferrari, 5548