

**Plenarvortrag**

PV XIV Do 9:45 Plenarsaal

**Tailoring ultrafast light pulses in waveguides** — ●CARSTEN FALLNICH — Institute of Applied Physics, University of Muenster, 48149 Muenster, Germany — MESA+ Institute of Nanotechnology, University of Twente, Enschede 7500 AE, The Netherlands

Waveguide-based optical systems are of interest for many applications related to a compact size and robustness, and third-order nonlinearities can be exploited at modest power levels, amongst others for parametric frequency conversion via four-wave mixing or intermodal cross-phase modulation. But to flexibly tailor the waveguide-internal electrical field of ultrafast light pulses, access to the amplitudes and phases of the

spectral components is needed, such that waveguide-based systems seem to be at a disadvantage compared to the common use of free-space arrangements with spatial light modulators. In order to introduce richer light tailoring functionalities into waveguide-based systems, e.g., for improved exploitation of nonlinear effects, the design of the waveguides has to be reconsidered in respect of the waveguide dispersion, the number of guided spatial modes, as well as the injected light composition in frequency, time, and space. Taking such aspects into account, the talk will show recent experimental as well as theoretical advances on waveguide optics ranging from broadband supercontinuum generation, over rapidly tunable ultrafast parametric oscillators, up to ultrafast optical switching and spatio-temporal mode control.