

## Seminar announcement

### ***Carrier-envelope phase stabilization of mode-locked lasers: towards zeptosecond timing control***

**Prof. Günter Steinmeyer** (MBI Berlin / Humboldt University Berlin)

**Date:** Friday, 9. November 2018, 14:00

**Location:** University of Neuchâtel, Time and Frequency Laboratory (LTF), UniMail  
Building G, meeting room D14

**Abstract:** Once laser pulse durations approach the single-cycle regime, the commonly used slowly-varying envelope approximation collapses, and the relative phase between carrier and envelope starts to play a decisive role. Up to the late 90s, the carrier-envelope phase (CEP) was inaccessible to measurements, and the key idea for overcoming this dilemma, i.e., the f-to-2f interferometer was conceived in a collaboration between ETH and PTB Braunschweig. While sub-femtosecond timing accuracy between carrier and envelope was already demonstrated shortly afterwards, it took more than a decade to bring jitters down to <10 attoseconds. One decisive step forward was the feed-forward method; another promising new approach is the active f-to-2f interferometer, which was recently demonstrated with residual jitters of about 5 attoseconds. Finally, this lecture touches fundamental limitations imposed by amplified spontaneous emission, degradation of intrapulse coherence, as well as detection shot noise. Avenues towards overcoming these obstacles are pointed out, with the vision of synthesizing optical waveforms at similar ease and precision as in microwave electronics.

FACULTÉ DES SCIENCES

Institut de physique

Secrétariat  
Av. de Belleaux 51  
CH-2000 Neuchâtel  
Tél : +41 (0)32 718 29 11  
Fax : +41 (0)32 718 29 01  
secretariat.physique@unine.ch