Universität Bern
Institut für Angewandte Physik
Sidlerstrasse 5
3012 Bern
Schweiz

Telefon: +41 (0)31 631 89 11
Telefax: +41 (0)31 631 37 65
E-Mail: IAPemail@iap.unibe.ch
WWW: http://www.iap.unibe.ch/

UNIVERSITÄT BERN

Seminar über Ultrafast Science and Technology

Referent: Dr. Gregor Knopp, Paul Scherrer Institute PSI, Villigen

Titel: Towards application of nonlinear time resolved X-ray spectroscopy

Extending the methodologies of nonlinear and quantum optics to X-ray wavelengths is a promising and exciting avenue, in the light of recent successful experiments at X-ray synchrotrons and X-ray Free FELs. With the development of free electron laser (FEL) radiation sources a new area of X-ray spectroscopy commenced which can have a ‘comparable’ impact as lasers had in nonlinear optics and spectroscopy. In nonlinear ultrafast time-resolved techniques, state specific information is often provided through multiphoton resonances with combinations of sequential photons. Theoretically, also combinations of X-ray photons resonant with high frequency core transitions, characterize different excitation processes due to specific sequences of light-matter interaction. In the recent years several estimations have been given but no clear general picture could be drawn even for the ‘simplest’ nonlinear X-ray processes like two-photon absorption (TPA). The dependency of TPA on the third or der nonlinear susceptibility enables to determine the strength of other nonlinear X-ray spectroscopies, including X-ray stimulated Raman (X-SR), transient gratings (X-TG) or four wave mixing (X-FWM). Recently an EUV-TG FEL experiment has been realized by Bencivenga et al. [1]. An objective goal of FEL driven ultrafast X-TG experiments is to access wave-vectors at the nm scale. I will discuss strategies and preliminary experimental results towards future nonlinear time-resolved X-ray approaches.
1. F. Bencivenga et al., Nature 520 (2015).

Zeit: Donnerstag, 26.11.2015, 11:15 Uhr

Ort: **Hörsaal B116**, Gebäude exakte Wissenschaften, Sidlerstrasse 5, Bern, Schweiz