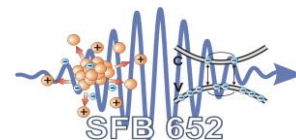




Universität  
Rostock



Traditio et Innovatio



**SFB - Seminar**

Sommersemester 2012

**Am Dienstag, den 17. April 2012**

**spricht um 13:30 Uhr**

im Hörsaal Wismarsche Strasse des Instituts für Physik

**Dipl. Phys. Frederik Süssmann**

(Max-Planck-Institut für Quantenoptik, Garching)

zum Thema

**“Carrier-envelope phase tagged imaging of the controlled electron acceleration from SiO<sub>2</sub> nanospheres in intense few-cycle laser fields”**

Waveform controlled light fields offer the possibility to manipulate ultrafast electronic processes on sub-cycle timescales. The optical lightwave control of the collective electron motion in nanostructured materials is a key to the design of electronic devices operating at up to petahertz frequencies. We have studied directional control of the electron emission from spherical SiO<sub>2</sub> nanoparticles in few-cycle laser fields with well-defined waveform. Projections of the three-dimensional electron momentum distributions were obtained via single-shot velocity-map imaging, where phase-tagging allowed retrieving the laser waveform for each laser shot. The application of this technique allowed us to efficiently suppress background contributions in the data and to obtain very accurate information on the amplitude and phase of the waveform-dependent electron emission. The experimental data that is obtained for 4 fs pulses centered at 720 nm at different intensities in the range  $(1-4)\times 10^{13}$  W/cm<sup>2</sup> is compared to quasi-classical meanfield Monte-Carlo simulations. The model calculations identify electron backscattering from the nanoparticle surface in highly dynamical localized fields as the main process responsible for the energetic electron emission from the nanoparticles. Results on larger SiO<sub>2</sub> nanospheres up to 400 nm diameter show a significant influence of laser propagation effects on the electron emission pattern.

Interessenten sind herzlich eingeladen!

Ansprechpartner: Prof. Th. Fennel