



**Mittwoch, 01.06.2016, um 16:00 Uhr**

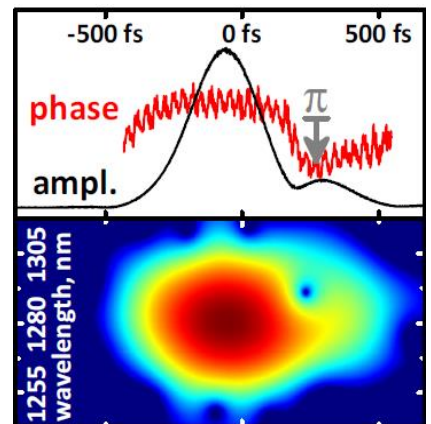
Ort: Reichenhainer Str. 90;  
Zentrales Hörsaal- und Seminargebäude,  
Raum 2/N013

**Prof. Dr. Ulrike Woggon**

Technische Universität Berlin  
Institut für Optik und Atomare Physik

## ***Coherent photonics with quantum dots***

We give an overview about present concepts to exploit principles of nonlinear optics in ultrafast devices for telecommunication. Room temperature quantum-coherent effects such as Rabi oscillations, pulse shaping and break-up are demonstrated with attosecond time-resolution. Femtosecond heterodyne pump-probe techniques are combined with cross-correlation pulse analysis [1] and quantum state tomography [2]. Applied to the transmission of a coherent state through an In(Ga)As based quantum dot optical amplifier, the Wigner function and the statistical moments of the field were extracted and used to determine the degree of population inversion and the signal-to-noise ratio in a sub-picosecond time window at room temperature operation. We can show that for suitably designed condensed matter systems, quantum-coherent effects are thus robust to be observable at room temperature, even in the presence of ultrafast dephasing, e.g. via electrically injected charged carriers.



[1] M. Kolarczik, N. Owschimikow, J. Korn, B. Lingnau, Y. Kaptan, D. Bimberg, E. Schöll, K. Lüdge and U. Woggon. *Quantum coherence induces pulse shape modification in a semiconductor optical amplifier at room temperature*. Nature Commun. **4**, 2953 (2013).

[2] N. B. Grosse, N. Owschimikow, R. Aust, B. Lingnau, A. Koltchanov, M. Kolarczik, K. Lüdge, and U. Woggon. *Pump-probe quantum state tomography in a semiconductor optical amplifier*. Optics Express **22**, 32520 (2014).



Alle Zuhörer sind ab 15:45 zu Kaffee und Tee vor dem Hörsaal eingeladen.

Informationen zum Vortrag erteilt:

Prof. Dr. Michael Schreiber, Tel. 0371 531-21910