



# Quantum Efficiency Seminar und Colloquium

**ALFRED HOLZWARTH**  
Max-Planck-Institut für  
Bioanorganische Chemie, Mülheim

## Ultrafast excited state dynamics of carotenoids and their role in photosynthetic systems

**ABSTRACT:** Carotenoids are essentially modified polyenes. Their excited electronic states are highly unusual and differ substantially from all other classes of organic molecules. These unusual properties are, inter alia, responsible also for their multiple functionalities as antenna and photoprotection components in photosynthetic systems.

Their unusual electronic properties lead e.g. to very interesting ultrafast excited state dynamics, which form the basis for the wide variety of biological functions of carotenoids. In the present talk we will discuss the ultrafast excited state relaxation and the role and character of intermediate states, in particular the so-called  $S^*$  state, for a variety of carotenoids of conjugation length 9-13 (1,2) and we will connect these properties to the understanding of their biological functions, like e.g. their vital photoprotection role (3).

### References

1. Ostroumov, E. E., Müller, M., Reus, M., and Holzwarth, A. R. (2011) *J. Phys. Chem. A* **115**, 3698-3712
2. Ostroumov, E., Müller, M. G., Marian, C. M., Kleinschmidt, M., and Holzwarth, A. R. (2009) *Phys. Rev. Lett.* **103**, 108302-1-108302-4
3. Holzwarth, A. R., Miloslavina, Y., Nilkens, M., and Jahns, P. (2009) *Chem. Phys. Lett.* **483**, 262-267

**Date:** Tuesday, February 14th, 2012 16:15 pm  
**Location:** Lecture Hall 1, Hermann-Herder-Str. 3, Freiburg

Contact: Andreas Buchleitner, Institute of Physics, Quantum Optics and Statistics  
T +49 761 203 5821 F +49 761 203 5967 E [buchleitner\\_office@physik.uni-freiburg.de](mailto:buchleitner_office@physik.uni-freiburg.de)  
[www.physik.uni-freiburg.de](http://www.physik.uni-freiburg.de)