

# TRANSIENT ABSORPTION SPECTROSCOPY

## Chair of Soft Matter Optoelectronics (EP II)

### 2. Questions for preparation

- 1) What would an experimental setup for investigating the wavelength dependence of the triplet state population decay look like?
- 2) Singlet and triplet excited states:
  - a. What is the difference between singlet and triplet states?
  - b. *"Singlet states can be populated by means of optical excitation but not triplet states"* - why?
  - c. The above statement implies that triplet states of the investigated complex ZnTPP are populated via the singlet states, i.e., absorption leads to the population of singlet states which are converted to triplet states. What could be the underlying conversion process? Can this process be identified in the present experiment?
- 3) What effect does the use of a lens with a focal length of 75 mm instead of 60 mm in the beam path of the probe beam have on the measurement procedure and the measured transient absorption signal?
- 4) What do you understand by the polarization of light? Can the pump and probe beam polarization play a major role in controlling the dynamics of the present experiment?
- 5) Airtight (or inert gas assisted) and dark storage can extend the shelf life of the solutions used in the experiment with respect to their optical properties. Explain the underlying processes.
- 6) P3HT is a polymer. How should the concentration of 1 mM be understood here?
- 7) Comprehend and explain the assumptions in the kinetics of triplet decay.
- 8) What is the significance of a negative or positive transient absorption? What are the underlying processes in each case?