

## **Seminar über Ultrafast Science and Technology**

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**Titel:** Ultra-fast Energy transfer dynamics in dye-doped organic nanoparticles

Electronic excitation energy transport mechanisms in molecular systems attract considerable attention due to their numerous applications in light-harvesting and optoelectronic devices [1,2]. The involved processes rely centrally on exciton interactions and dynamics [3,4]. In this work, we utilize time-resolved fluorescence spectroscopy to investigate the photophysical properties of dye-doped, polymeric, organic nanoparticles (ONP), which imitate the function of natural light-harvesting complexes found in photosynthetic organisms [5]. The exciton population decay kinetics are found to depend on the excitation fluence, unraveling singlet-singlet exciton annihilation (SSA). The latter is a key parameter in revealing the time scale for exciton diffusion within the ONP [6,7]. Moreover, we demonstrate the effect of the inhomogeneous intensity profile of the excitation beam on the apparent annihilation rate. Furthermore, exciton energy transfer (EET) ensures efficient exciton migration within chromophores. We use fluorescence up-conversion spectroscopy with polarization-resolved excitation and detection to monitor time resolved fluorescence anisotropy decay. This allows us to characterize the femtosecond time scale for exciton hopping to nearest neighbors.

**Zeit:** Montag, 30. Januar 2023, 11.15 Uhr

**Ort:** **Hörsaal B116**, Gebäude Exakte Wissenschaften, Sidlerstrasse 5, Bern