

Dienstag, 17.10.2023

Hörsaal D, Chemiezentralgebäude, 17:15 Uhr

Sprecher: Gregory D. Scholes
(Princeton, USA)

**Titel: Synchronization, Excitons, and
Superpositions in Chemical Systems**

Abstract:

Synchronization abounds in nature—why is it so hard to synchronize quantum systems? I will discuss this general question and its relationship to quantum coherence and exciton delocalization. I will then report new experiments that show how a molecular exciton state can launch two a superposition of two chemical reactions. Specifically, we studied femtosecond proton transfer in a symmetric molecule with two identical reactant sites that are spatially apart (pigment yellow 101, PY101). PY101 comprises a chromophore pair, where each chromophore can undergo excited state intramolecular proton transfer (ESIPT). For this molecule, only a single ESIPT reaction happens after photo-excitation; the proton is transferred on either the left or the right side of the molecule. With this reaction launched from a superposition of two local basis states, our experimental data suggest that the nuclear wavepackets evolve in lock-step as a superposition of probability amplitudes until decoherence collapses the system to a product. The work indicates that in this, and related, experimental designs, the transition from quantum to classical dynamics can be studied.

Organisation: T. Brixner