

Research Project

Picosecond Transient Absorption Setup for Detection of Short-Lived Photoproducts and Excited States in Molecular Systems

Third-party funded project

Project title Picosecond Transient Absorption Setup for Detection of Short-Lived Photoproducts and Excited States in Molecular Systems

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Department

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Status Completed

Many photophysical and photochemical processes which are relevant for light-to-chemical energy conversion occur on very rapid timescales. Time-resolved UV-Vis absorption spectroscopy has become an indispensable tool in modern photochemistry. Several ongoing Ph. D. theses and postdoctoral research projects in the main applicant's group ask for a transient absorption spectrometer with picosecond time resolution and an appropriate laser source. Among these projects are for example the investigation of photoinduced multi-electron transfer reactions in order to spatially separate multiple electrons from multiple holes, which is of key importance for producing chemical fuels with sunlight as energy input (projects 1 and 2). Similarly, picosecond transient absorption spectroscopy will permit mechanistic studies of photoinduced proton-coupled electron transfer (PCET) reactions which will greatly further our current fundamental understanding of this important class of reactions (project 3). The activation of small inert molecules such as H_2O , CO_2 or N_2 will invariably rely on multi-electron, multi-proton chemistry hence the proposed photochemical studies are important in the greater context of solar energy conversion.

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