Dynamische Spektroskopien
Fakultät für Chemie
Technische Universität München

Master's Project:
Ultrafast Energy Conversion in Biological Photosystems

The Work Group

The Dynamic Spectroscopies group works with dynamical processes in a wide range of chemical, biological, and physical systems. We develop and use state-of-the-art techniques in optical spectroscopy to follow photo-induced dynamics down to the very first instances after light absorption.

Project Background

All forms of higher life on earth rely directly or indirectly on photosynthesis - the biological conversion of light into chemical energy. Substantial attention is being paid to these crucial processes, not only in terms of fundamental principles of nature, but also as inspiration for artificial light-driven systems such as photovoltaics and photocatalysts.

The photosystems of green plants and oxygen-evolving bacteria, whose core functionality is maintained by the two pigment-protein complexes Photosystem I and Photosystem II, are especially privileged due to their direct importance to human life.

In this project, we investigate the processes involved from light capture, *via* energy transfe, to charge separation in the photosynthetic reaction center of Photosystem I. The tools of choice is temperature-controlled and time-resolved absorption spectroscopies, where we can follow dynamics down to only 10 femtoseconds.

The successfully completed project will provide important insight into the functionality of this complex system, aiding both in the theoretical modeling of pigment-protein complexes and in the interpretation of data from biochemical experiments.

Your Responsibilities

- Recording and analyzing time-resolved absorption and fluorescence data
- Operating and potentially expanding instruments for ultrafast optical experiments
- Assisting the theory team with modeling and data interpretation
- Assisting the biochemistry team with sample preparation and purification

  For further information about your responsibilities and the daily workflow, contact Prof. Hauer or Dr. Thyrhaug Dynamic Spectroscopies.

You Offer

- An interest in the fundamental processes of photosynthesis
- A Bachelor's degree in chemistry or physics
- Strong physical chemistry background
- Basic knowledge of spectroscopic methods (UV/Vis, fluorescence . . .)
- Programming experience (LabView, Python, MatLab) helpful but not essential
- Willingness to integrate in a diverse and collaborative workgroup

We Offer

- A positive and international work-environment
- The possibility to work with national and international researchers with diverse scientific backgrounds
- An opportunity to learn:
- How to design and perform advanced optical experiments
- How to analyze and interpret complex kinetic data
- How to effectively use scientific programming in a research-setting

Bewerbung

We are looking forward to hear from you! Please send inquiries and applications by E-Mail to Prof. Hauer (juergen.hauer@tum.de) or Dr. Thyrhaug (erling.thyrhaug@tum.de).

Technische Universität München
Department of Chemistry
Prof. Dr. Jürgen Hauer
Tel. +49-89-289-13420
juergen.hauer@tum.de
https://www.department.ch.tum.de/dynspec/startseite/
www.tum.de