



Elite Study Programme in Macromolecular Science

Module M022

Light Harvesting Processes

Tutorials
April 7 and 8, 2011
University of Bayreuth, Germany

Conference
April 10-14, 2011
Kloster Banz, Germany

Winter term 2010/2011

(This is a joint module for ENB and GRAKO)

The teaching module in the winter term 2010/2011 within the Elite Study Programme "Macromolecular Science" is on "**Light Harvesting Processes**". The courses cover aspects in biology, chemistry and physics of photosynthesis, natural and synthetic light harvesting materials and solar cells. The module consists of three parts. The students are expected to attend all the three parts.

I. Series of lectures

April 7 and 8, 2011, **Lecture hall: S84, NW II, UBT**

The tutorials will be held by:

i). Prof. Stephan Kümmel, Theoretical Physics IV, Bayreuth

7. April 2011 von 10 - 11.30 Uhr

Challenges in the understanding of organic solar cells

The lecture will give an introduction into the molecular understanding of organic solar cells and review the related elementary processes. The concepts of exciton formation, migration, and dissociation will be discussed. The purpose of this lecture is to provide background information which should be helpful for understanding some of the theory talks at LHP 2011.

ii). Prof. René Janssen, Technical University Eindhoven, NL

8. April 2011 von 10 - 12 Uhr

Principles of organic solar cells

The lecture will give an overview of the working principles of organic and polymer solar cells and highlight the subtle interplay of chemical and electronic structure, photophysics, charge transport, nanoscale morphology and device architecture in reaching higher efficiencies. Morphological and photophysical studies will be presented that provide insights into existing loss mechanisms and can lead to improved materials design.

iii). Prof. Dr. Hideki Hashimoto, Osaka City University, Japan

8. April 2011 von 14 - 16 Uhr

"Structures and Functions of Carotenoids in Photosynthesis"

I will outline the various aspects of spectroscopy on carotenoids from basic to advanced research purposes so that the beginner can understand the fascinating research subject of "Carotenoids in Photosynthesis". The spectroscopy that I will talk about includes conventional absorption, fluorescence and Raman spectroscopies as well as highly advanced ultrafast time-resolved and coherent spectroscopies.

II. Conference on „Light Harvesting Processes”

April 10-14, 2011, Banz Monastery

This conference gives insight into the complex processes in the photochemical and dark reactions involved in photosynthesis. Additionally this meeting will give ideas and inspirations to understand and mimic synthetically some of the steps involved in the above process. Closely related technological phenomena are synthetic light harvesting and photovoltaics, which also gets detailed attention. Theoretical aspects of the above topics are also dealt with. Aim of the conference is to bring together scientists from different areas such as biology, chemistry, physics and technology, working in the field of light-harvesting processes, photovoltaics and related subjects. The meeting will provide a platform for interdisciplinary communication and the exchange of ideas.

The confirmed invited speakers include: Jean-Luc Bredas (Atlanta, USA), Richard Friend (Cambridge, United Kingdom), Hideki Hashimoto (Osaka, Japan), René Janssen (Eindhoven, The Netherlands), Frederik Krebs (Roskilde, Denmark), Thomas Moore (Tempe, USA), Jenny Nelson (London, United Kingdom), Gregory Scholes (Toronto, Canada).

The homepage of the conference is: <http://www.LHP-bayreuth.de>

III. Seminar on the scientific topics covered in the conference

The participating students will be divided into interdisciplinary groups consisting of 2 students per group. Each group will select one main topic of the conference and will prepare a presentation including the basics, different stages of the scientific development as well as highlights. A seminar in English with a duration of 30 minutes (15 x 2) will be given by each group.

Please consult Prof. M. Thelakkat (ENB) or Prof. S. Kümmel (GRAKO) regarding the topics and division of groups.

Time Schedule

Tutorial:

April 7th, 2011: Lecture hall: S84, NW II

10 a.m. to 11:30 a.m. Stephan Kümmel

April 8th, 2011: Lecture hall: S84, NW II

10 a.m. to 12 noon René Janssen

2 p.m. to 4 p.m. Hideki Hashimoto

Seminar:

April 28th, 2011: Lecture hall: S84, NW II

1 p.m. to 4 p.m.

Selected presentations:

:: (Paul Reichstein, Matthias Dötterl, Felix Deschler) Recent Advances in Organic Solar Cell - Architecture: Multilayer Cells. Presented within the scope of the third international Light-Harvesting Processes Conference (LHP 2011), April 28, 2011.

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:: (Tobias Schmidt, Hubertus Burchardt) Polymer Solar Cells (PSCs): Nanomorphology and Physical Understanding. Presented within the scope of the third international Light-Harvesting Processes Conference (LHP 2011), April 28, 2011.

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