

# MARE BALTICUM LECTURES

## LIGHT INDUCED PROCESSES IN MOLECULAR SYSTEMS AND NOVEL MATERIALS

### PART I - TIME-RESOLVED SPECTROSCOPY

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| <b>Date:</b>            | 19.6., 26.6., 3.7., and 10.7.; 9 c.t. till 11 o'clock                        |
| <b>Location:</b>        | Seminar room 110, Life, Light & Matter, Albert-Einstein-Str. 25              |
| <b>Lecturers:</b>       | Tõnu Pullerits (Lund University), Oliver Kühn, and Stefan Lochbrunner        |
| <b>Target audience:</b> | Master and PhD students and postdocs in Life Sciences, Chemistry and Physics |
| <b>Registration:</b>    | via stud.ip; lecture nr. 12330   |



#### Workshop description:

Light induced processes in molecular systems and nanomaterials are currently subject of intense research activities and play a crucial role for a wide range of recent and future applications. This includes photocatalysis, solar cells, photoswitches, light harvesting and sensing in life sciences, imaging, and information processing.

Time-resolved spectroscopy with its advanced implementations such as two-dimensional spectroscopy are central and wide-spread techniques to investigate light induced processes. The workshop gives an introduction and overview about the basics and application of these experimental and theoretical tools

The format is a combination of lectures and journal club. The lecturers will first give an introduction to a specific topic, then the participants will read a key publication in which the presented concepts, processes, or methods are applied to problems in chemistry, biology, or medicine. These applications are then discussed in a seminar.

#### Topics:

- basics of time-resolved spectroscopy
- pump-probe approach, analysis and interpretation
- theoretical concepts, potential energy surfaces, quantum dynamics, kinetics
- multidimensional electronic spectroscopy
- phase matching directions, analysis of signals for simple systems
- application to charge and energy transfer in biological and material systems