PHYS-609 **Modern photovoltaic technologies**

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Cursus	Sem.	Type
Advanced Manufacturing		Opt.
Photonics		Opt.

Language of teaching	English
Credits	2
Session	
Exam	Oral presentation
Workload	60h
Hours	**27**
Courses	18
Exercises	9
Number of positions	

Frequency

Every year

Remark

Next time: June 13th - 17th 2022

Summary

A link between the fundamental physics, device operation and technological development of various solar cell technologies. Learning about all modern photovoltaic technlogies incl. industrially relevant wafer based silicon, thin film chalcogenide, III-V, multijunction, organic and hybrid solar cells.

Content

Day 1
1.1 Introduction, solar cell basics and operation, current of solar cell technologies
1.2 Si wafer-based solar cells
1.3 CIGS & CdTe solar cells
1.4 III-V solar cells
Day 2
2.1 Organic semiconductors – molecular orbitals and photoinduced processes
2.2. Organic and Dye-sensitized solar cells
2.3. Perovskite and Hybrid solar cells
Day 3
3.1. Absorption of semiconductors with direct and indirect bandgaps
3.2. Junction formation and processing of standard crystalline silicon solar cells
3.3. Advanced silicon solar cell designs

Keywords

photovoltaics, inorganic semiconductors, organic semiconductors, optics, light management

Learning Prerequisites

Recommended courses

Basic physics, basic chemistry, introduction to quantum mechanics

Teaching methods

Three days teaching (ex-cathedra with short questions)

Expected student activities

One day to work on individual exercises and to prepare a 10 min presentation

Assessment methods

Presentaion of the assignment on the last day