Modulbezeichnung:	**Physikalisches Seminar: Experimental techniques in quantum optics (PS)** (Seminar on Physics: Experimental techniques in quantum optics)	**5 ECTS**
Modulverantwortliche/r:	Christoph Marquardt, Maria Chekhova, Markus Sondermann	
Lehrende:	Maria Chekhova, Christoph Marquardt, Markus Sondermann	

Startsemester: SS 2015	Dauer: 1 Semester	Turnus: unregelmäßig
Präsenzzeit: 30 Std.	Eigenstudium: 120 Std.	Sprache: Deutsch oder Englisch

Lehrveranstaltungen:

Quantum and classical experiments with structured light (SS 2015, Hauptseminar, 2 SWS, Peter Banzer et al.)

Inhalt:

Contents

This seminar treats various experimental techniques which are of importance in many state-of-the-art experiments in quantum optics and related research areas. For each of the seminar's topics the presentations will cover the corresponding basics and connect to current research.

Topics

- Optical tweezers
- Single-photon imaging
- Spatial light modulators
- Homodyne detection
- Laser cooling of atoms
- Generation of optical harmonics
- Ion traps
- High-resolution microscopy
- Hanbury Brown - Twiss interferometry
- Whispering-gallery resonators
- Quantum state reconstruction
- Single-photon detectors

Lernziele und Kompetenzen:

Learning goals and competences

Students

- comprehend an interesting physical topic in a short time frame
- identify and interpret the appropriate literature
- select and organize the relevant information for the presentation
- compose a presentation on the topic at the appropriate level for the audience
- use the appropriate presentation techniques and tools
- criticize and defend the topic in a scientific discussion

Literatur:

Literature

Primary literature will be provided by the supervisors of the individual topics.

Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:

Das Modul ist im Kontext der folgenden Studienfächer/Vertiefungsrichtungen verwendbar:

[1] **Physics (Master of Science)**
(Po-Vers. 2015s | Master examination | Master examination | Physics seminar)

[2] **Physics (Master of Science)**
(Po-Vers. 2015s | Master examination | Master examination - Elite study program | Physics seminar)

[3] **Physik (Bachelor of Science)**
(Po-Vers. 2010 | Regulärer Bachelorstudiengang | Module des 3. bis 6. Fachsemesters | Physikalisches Seminar)

[4] **Physik (Bachelor of Science)**
(Po-Vers. 2010 | Integrierter Bachelor- und Masterstudiengang (Forschungsstudiengang) | Module der Masterprüfung

| Physikalisches Seminar)

[5] **Physik (Bachelor of Science)**
(Po-Vers. 2010 | Integrierter Bachelor- und Masterstudiengang (Forschungsstudiengang) | Module der Masterprüfung | Physics seminar)

[6] **Physik (Master of Science)**
(Po-Vers. 2010 | Masterprüfung | Masterprüfung - beschleunigtes Verfahren (Forschungsstudiengang) | Physikalisches Seminar)

[7] **Physik (Master of Science)**
(Po-Vers. 2010 | Masterprüfung | Masterprüfung | Physikalisches Seminar)

Studien-/Prüfungsleistungen:

Physikalisches Seminar: Experimental techniques in quantum optics (Prüfungsnummer: 757777)
Prüfungsleistung, mündliche Prüfung, Dauer (in Minuten): 45
Anteil an der Berechnung der Modulnote: 100%
weitere Erläuterungen:
Mandatory attendance, Anwesenheitspflicht

Erstablegung: SS 2015, 1. Wdh.: keine Angabe
1. Prüfer: Christoph Marquardt

Organisatorisches:

This course will be held in English, i.e. seminar talks are expected to be given in English, too. This also applies to the discussion during and after the presentations.