Modulbezeichnung:	**Seminar: Quantum information and quantum computation (PS-Quant)** (Seminar: Quantum information and quantum computation)	**5 ECTS**
Modulverantwortliche/r:	Hanno Sahlmann	
Lehrende:	Hanno Sahlmann	

Startsemester: WS 2018/2019	Dauer: 1 Semester	Turnus: unregelmäßig
Präsenzzeit: 30 Std.	Eigenstudium: 120 Std.	Sprache: Englisch

Lehrveranstaltungen:

Physics seminar: Quantum information and quantum computation (WS 2018/2019, Hauptseminar, 2 SWS, Hanno Sahlmann)

Inhalt:

The seminar will serve as an introduction to the basic concepts of quantum information theory and quantum computation. Topics covered include

Basics of quantum theory:

- states
- evolution and measurement
- tensor product and entanglement

Uses of entanglement:

- Bell inequalities
- quantum cryptography
- quantum teleportation
- quantum information

Quantum computing:

- quantum circuits
- quantum algorithm

We will use mostly textbooks and lecture notes as a basis for the preparation of the talks. An important source will be the lecture notes of John Preskill
http://www.theory.caltech.edu/people/preskill/ph229/

Lernziele und Kompetenzen:

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:

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. 2018w | NatFak | Physics (Master of Science) | Master's examination | Physics seminar(s))

Studien-/Prüfungsleistungen:

Seminar: Quantum information and quantum computation (Prüfungsnummer: 992201)
(englische Bezeichnung: Seminar: Quantum information and quantum computation)

Prüfungsleistung, mündliche Prüfung, Dauer (in Minuten): 45
Anteil an der Berechnung der Modulnote: 100% Prüfungssprache: Deutsch oder Englisch

Erstablegung: WS 2018/2019, 1. Wdh.: keine Angabe

1. Prüfer: Hanno Sahlmann

Bemerkungen:

May be applied to specialisation 'Optical sciences' in the physics master program starting winter term 2018/19.