

**Modulbezeichnung:** Seminar: Modern Optics - Recent advances in nonlinear photonics and communications (PS-MO-Comm) **5 ECTS**  
(Seminar: Modern Optics - Recent advances in nonlinear photonics and communications)

Modulverantwortliche/r: Birgit Stiller  
Lehrende: Birgit Stiller

Startsemester: WS 2020/2021      Dauer: 1 Semester      Turnus: unregelmäßig  
Präsenzzeit: 30 Std.      Eigenstudium: 120 Std.      Sprache: Englisch

#### Lehrveranstaltungen:

Physics Seminar: "Modern Optics - Recent advances in nonlinear photonics and communications" (WS 2020/2021, Hauptseminar, 2 SWS, Birgit Stiller et al.)

#### Inhalt:

In this seminar we will cover the following topics:

- Supercontinuum generation: sculpturing of broadband light
- Light storage, slow light and electro-magnetic induced transparency - manipulating the speed of information transmission
- Attoscience: light-matter interaction with attosecond temporal resolution
- Experimental cavity optomechanics - interaction of light and vibration
- New waveguides for nonlinear optics, from PCFs to nano waveguide arrays
- Secure communications - hacking the (theoretically) 100%-secure communication channels
- Frequency combs: development & applications
- Silicon photonics - optical chips replacing electronic wires
- Optical waveform generation
- Optical fiber sensing - fast, green, efficient, high-precision sensing of the environment
- Frog and spider, crab and rabbit: techniques to characterize duration and phase of the shortest light pulses
- Nonlinear optical signal processing - harnessing nonlinear effects for advanced communications

#### 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:

Will be provided individually for each talk.

#### Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:

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

##### [1] Physik mit integriertem Doktorandenkolleg (Master of Science)

(Po-Vers. 2018w | NatFak | Elitestudiengang Physik mit integriertem Doktorandenkolleg (Master of Science) | Gesamtkonto | Physics seminar(s) | Modern Optics - Recent advances in nonlinear photonics and communications)

Dieses Modul ist daneben auch in den Studienfächern "Materials Physics (Master of Science)", "Physics (Master of Science)", "Physik (Master of Science)" verwendbar.

#### Studien-/Prüfungsleistungen:

Modern Optics - Recent advances in nonlinear photonics and communications (Prüfungsnummer: 71921)

Prüfungsleistung, mündliche Prüfung, Dauer (in Minuten): 45

Anteil an der Berechnung der Modulnote: 100%

Erstablesung: WS 2020/2021, 1. Wdh.: WS 2020/2021 (nur für Wiederholer)

1. Prüfer: Birgit Stiller

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**Organisatorisches:**

Please register using StudOn (StudOn-ID: 3246206) www: [https://www.studon.fau.de/crs3246206\\_join.html](https://www.studon.fau.de/crs3246206_join.html)