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**Modulbezeichnung:** Quantum Chemistry (CM-QC) 10 ECTS  
(Quantum Chemistry)

Modulverantwortliche/r: Andreas Görling  
Lehrende: Christian Neiß, Andreas Görling

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|-----------------------------|------------------------|-----------------------|
| Startsemester: WS 2020/2021 | Dauer: 2 Semester      | Turnus: jährlich (WS) |
| Präsenzzeit: 90 Std.        | Eigenstudium: 210 Std. | Sprache: Englisch     |

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#### Lehrveranstaltungen:

##### Quantum Chemistry - WS:

###### Winter Term:

1. Quantum Chemistry 1 (2V)
2. Quantum Chemistry 1 Seminar (1S)

Quantum Chemistry I (WS 2020/2021, Vorlesung mit Übung, 3 SWS, Andreas Görling et al.)

##### Quantum Chemistry - SS:

###### Summer Term:

3. Quantum Chemistry 2 (2V)
4. Quantum Chemistry 2 Seminar (1S)

Quantum Chemistry II (SS 2021, Vorlesung mit Übung, 3 SWS, Andreas Görling et al.)

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#### Inhalt:

- Introduction to modern methods and current research issues in the field of quantum and computer chemistry
- Hartree-Fock, DFT, Many Body Perturbation Theory
- Configuration Interaction, Second Quantization, Coupled Cluster
- TD-HF, TD-DFT, RPA

#### Lernziele und Kompetenzen:

Students ...

- obtain sound knowledge in basic and advanced methods of quantum chemistry
- are able to solve mathematical problems occurring in quantum chemistry
- are able to understand and assess scientific reports in the field of quantum chemistry

#### Literatur:

- Attila Szabo, Neil S. Ostlund: Modern Quantum Chemistry, Dover 1996
  - Frank Jensen: Introduction to Computational Chemistry, Wiley 2017 (3rd ed.)
  - Ira N. Levine: Quantum Chemistry, Pearson 2016 (7th ed.)
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#### Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:

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

##### [1] Molecular Science (Master of Science): ab 1. Semester

(Po-Vers. 2020w | NatFak | Molecular Science (Master of Science) | Compulsory elective module | Quantum Chemistry | Quantum Chemistry)

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#### Studien-/Prüfungsleistungen:

Quantum Chemistry (Prüfungsnummer: 65071)

Prüfungsleistung, mündliche Prüfung, Dauer (in Minuten): 30

Anteil an der Berechnung der Modulnote: 100%

weitere Erläuterungen:

O30 (PL): Oral Examination (30 minutes) or alternative examination according to FAU Corona Statutes!

Prüfungssprache: Englisch

Erstablesung: SS 2021, 1. Wdh.: WS 2021/2022

1. Prüfer: Andreas Görling

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**Organisatorisches:**

- The core module "Quantum Chemistry" starts only in winter term!
- **Quantum Chemistry** (CM-QC/QuantCh) will be taught online (synchronous/asynchronous) in winter term 20/21 and summer term 21 until further notice
- Students have to register for this module (check registration periods)!
- Registration/further information via StudOn!

**Bemerkungen:**

Module compatibility:

- Lecture module within the **Core module** „Quantum Chemistry“ in M. Sc. Chemistry
- Lecture module within the **Compulsory Elective Module** in M.Sc. Chemistry (if not chosen as Core module) or M. Sc. Molecular Science