

## Lehrveranstaltung

Deutscher Titel: Anwendungen der Quantenmechanik für Festkörperphysiker

Englischer Titel: Practical Quantum Mechanics for Experimental Solid State Physicists

Vorlesungssprache: Deutsch und Englisch

Inhalt (englisch): The 1st lecture will be given on Thursday April 15th 2021.  
Lecturer: Hao Tjeng, MPI CPfS Dresden.  
Please send me an email if you are interested:  
lecture.tjeng@cpfs.mpg.de

The lectures will be given via ZOOM:  
<https://zoom.us/j/7149396719>  
Meeting ID: 714 939 6719  
Password: 01187

The lectures take place on Thursdays from 9:20 to 10:50.

The Meeting room will be open 10 minutes before the start of the lecture. Please use your real name as user name, so that the host can identify and include you.

Electronic structure of solids with examples which include also strongly correlated systems:

- hydrogen molecule, chains, planes, solids
- Peierls's transition, impurity states
- surface states, polar terminations
- Tight-Binding calculations: cuprates, ruthenates
- One-particle vs. Many-body framework
- Ground state and Excitations
- Density of States and Spectral Weights, Doping dependence
- H<sub>2</sub> molecule – Heitler-London vs. Hubbard
- Transition Metal Oxides: configuration interaction
- Kondo systems: Gunnarsson and Schönhammer

Voraussetzungen: Quantum Mechanics, Solid State Physics

Umfang der Lehrveranstaltung in Semesterwochenstunden:

Vorlesung: 2

Hauptseminar: 0

Seminar/Übung: 0

Praktikum: 0

Nachweis: Ja / Yes

Einschreibung: zoom --1. Vorlesung / 1st Lecture: 15 April 2021

Kommentar: The lecture aims to explain the basic concepts and tools to describe the electronic structure of solid state materials. The contrast between one-particle approaches and many-body models will be clarified. Hands-on exercises using computers will be presented to address topics of current interest.