## Module description

### Module title
Electron Electron Interaction

### Abbreviation
11-EEW-102-m01

### Module coordinator
Managing Director of the Institute of Theoretical Physics and Astrophysics

### Module offered by
Faculty of Physics and Astronomy

### ECTS
4

### Method of grading
Numerical grade

### Only after succ. compl. of module(s)
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### Duration
1 semester

### Module level
Graduate

### Other prerequisites
Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.

### Contents
1. Introduction, systems, Landau theory
2. Interacting electron gas
3. One-dimensional electron gas (without interaction)
4. Introduction to boson phase fields and interactions
5. Calculation of correlation functions
6. Method of functional integrals
7. Renormalisation groups
8. Consideration of spin
9. One-dimensional lattice models
10. Impurities in Luttinger liquids

### Intended learning outcomes
The students know the principles of the theoretical description of electron-electron interactions in one dimension.

### Courses
(type, number of weekly contact hours, language — if other than German)
V + R (no information on SWS (weekly contact hours) and course language available)

### Method of assessment
(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)
Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.
Language of assessment: German, English

### Allocation of places
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### Additional information
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### Referred to in LPO I (examination regulations for teaching-degree programmes)
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### Module appears in
- Master’s degree (1 major) Physics (2010)
- Master’s degree (1 major) Physics (2011)
- Master’s degree (1 major) Nanostructure Technology (2011)
| Master's degree (1 major) Nanostructure Technology (2010) |
| Master's degree (1 major) Mathematical Physics (2012) |
| Master's degree (1 major) FOKUS Physics (2010) |
| Master's degree (1 major) FOKUS Physics (2011) |
| Master's degree (1 major) FOKUS Physics (2006) |