| Module title | | | Abbreviation |
|---|---|---|---|
| **Renormalization Group and Critical Phenomena** | | | 11-CRP-Int-201-m01 |
| **Module coordinator** | | **Module offered by** | |
| Managing Director of the Institute of Theoretical Physics and Astrophysics | | Faculty of Physics and Astronomy | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 6 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

1. Phase transitions
2. Mean field theory
3. The concept of the renormalization group (RG)
4. Phase diagrams and fixed points
5. Perturbation-theoretical renormalization group
6. Low-dimensional systems
7. Conformal symmetry

**Intended learning outcomes**

Profound knowledge of the principles of scale invariance and the renormalization group (RG) in statistical physics. Understanding of the concept of the RG flow with respect to effective field theories in both statistical and quantum field theory.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (3) + R (1)
Module taught in: English

**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 to 120 minutes) or b) oral examination of one candidate each (approx. 30 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or d) project report (approx. 8 to 10 pages) or e) presentation/talk (approx. 30 minutes).
If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.
Language of assessment: English
Assessment offered: In the semester in which the course is offered and in the subsequent semester

**Allocation of places**

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**Additional information**

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**Workload**

180 h

**Teaching cycle**

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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 International (2020)

exchange program Physics (2023)