## Module

**Plasma Physics: Fundamentals**

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<thead>
<tr>
<th>Code</th>
<th>71063</th>
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<tbody>
<tr>
<td>Instruction language</td>
<td>English</td>
<td></td>
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<tr>
<td>ECTS credits</td>
<td>6</td>
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<td>Credit hours</td>
<td>5</td>
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<tr>
<td>Duration</td>
<td>1 semester</td>
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<tr>
<td>Cycle</td>
<td>Each winter semester</td>
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<tr>
<td>Coordinator</td>
<td>Dean of Physics Studies</td>
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<tr>
<td>Lecturer</td>
<td>Dr. Emanuele Poli</td>
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### Allocation to study programs
- Physics M.Sc., elective module, 1\(^{st}\) or 2\(^{nd}\) semester
- Wirtschaftsphysik M.Sc., elective module, 1\(^{st}\) - 3\(^{rd}\) semester

### Formal prerequisites
- None

### Recommended prerequisites
- Electrodynamics, Maxwell’s equations

### Learning objectives
- Students who successfully passed this module
  - know the applications of Plasma Physics in nature and technology
  - are able to carry out theoretical or experimental research in plasma physics

### Syllabus
- Foundations of Plasma Physics
  - a) Introduction to Plasma Physics
  - b) Single-Particle Motion
  - c) Collisions and Radiation
  - d) Continuum Description
  - e) Dissipative Plasmas
  - f) Waves in Homogeneous Plasmas
  - g) Kinetic Description

### Literature
- Lecture Notes by F. Jenko and E. Poli
- R. Kippenhahn C. Möllenhoff, Elementare Plasmaphysik, BI, 1975
- R.M. Kulsrud, Plasma Physics for Astrophysics, PUP, 2004
- I.H. Hutchinson, Principles of Plasma Diagnostics, CUP 2005
- S. Jardin, Computational Methods in Plasma Physics, CRC Press, 2010
| **Teaching and learning methods** | Lecture (3 hours per week)  
Exercise (2 hours per week) |
|----------------------------------|-----------------------------|
| **Workload**                    | 45 hours lecture (attendance time)  
30 hours exercise (attendance time)  
105 hours self-study and exam preparation  
Total: 180 hours |
| **Assessment**                  | Written or oral examination. A prerequisite for the participation in the examination is an ungraded course achievement. Form and scope of the examination and of the course achievement are determined and notified by the lecturer at the beginning of the course. |
| **Examination**                 | 12080 Fundamentals of Plasma Physics (precourse)  
12079 Fundamentals of Plasma Physics |
| **Grading procedure**           | The module grade is the examination grade. |
| **Basis for**                   | Module *Plasma Physics: Applications* |