## Module: Plasma Physics: Applications

<table>
<thead>
<tr>
<th>Code</th>
<th>71064</th>
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<tbody>
<tr>
<td>Instruction language</td>
<td>English</td>
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<tr>
<td>ECTS credits</td>
<td>6</td>
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<tr>
<td>Credit hours</td>
<td>5</td>
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<tr>
<td>Duration</td>
<td>1 semester</td>
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<td>Cycle</td>
<td>Each summer 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. Thomas Eich, Dr. Emanuele Poli</td>
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**Allocation to study programs**
- Physics M.Sc., elective module, 1st or 2nd semester
- Wirtschaftsphysik M.Sc., elective module, 1st - 3rd semester

**Formal prerequisites**
- None

**Recommended prerequisites**
- Module Plasma Physics: Fundamentals

**Learning objectives**
- Students who successfully passed this module
  - know applications of plasma physics in nature and technology
  - understand the problems of fusion research for energy generation
  - are able to carry out theoretical and experimental research in plasma physics

**Syllabus**
- Introduction to modern fusion research
  - a) fusion energy
  - b) inclusion of high-temperature plasmas
  - c) tokamaks
  - d) Shock-induced transport
  - e) plasma turbulence
  - f) Fusion Research: Development, Status and Perspectives

**Laboratory course:**
- Plasma technology
- Plasma crystal
- Plasma interferometry
- Plasma spectroscopy

**Literature**
- Lecture Notes by F. Jenko and E. Poli
- R.J. Goldston, P.H. Rutherford, Plasmaphysik, Vieweg, 1998
- 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)
- One-week practical training in the recess period at the MPI Garching.

### Workload
- 45 hours lecture (attendance time)
- 45 hours laboratory course (attendance time)
- 90 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
- 12082 Plasma Physics: Applications (precourse)
- 12081 Plasma Physics: Applications

### Grading procedure
- The module grade is the examination grade.

### Basis for
- Research in the field of Plasma Physics