



Modul	<b><i>Fundamentals of Plasma Physics</i></b>
Code	71063
Unterrichtssprache	English
ECTS-Punkte	6
Präsenzzeit	5 hours per week
Dauer	1 Semester
Turnus	each Winter Semester
Modulkoordinator	Dean of Physics Studies
Dozenten	Apl. Prof. Dr. Emanuele Poli
Einordnung in die Studiengänge	Physics M.Sc., elective Wirtschaftsphysik M.Sc., elective
Empfohlene Vorkenntnisse	Fundamentals of electrodynamics and classical mechanics
Lernergebnisse	Students who successfully passed this module <ul style="list-style-type: none"><li>• know the basic applications of plasma physics in nature and technology,</li><li>• master the fundamental theoretical framework needed to carry out research in plasma physics.</li></ul>
Inhalt	In diesem Modul werden folgende fachliche Inhalte vermittelt: Foundations of Plasma Physics <ul style="list-style-type: none"><li>a) Examples of plasmas in nature and laboratories and basic properties of plasmas</li><li>b) Single-particle motion in homogeneous and inhomogeneous electromagnetic fields</li><li>c) Continuum description: multi-fluid and single-fluid treatment of hot plasmas</li><li>d) Kinetic description: Vlasov and Fokker-Planck equations, basic properties of stochastic transport</li><li>e) Waves and instabilities in plasmas</li><li>f) Fundamentals of fluid and plasma turbulence</li></ul>
Literatur	Lecture Notes by E. Poli T.J.M. Boyd, J.J. Sanderson, <i>The Physics of Plasmas</i> , Cambridge University Press, 2003 R.J. Goldston, P.H. Rutherford, <i>Plasmaphysik</i> , Vieweg, 1998 I.H. Hutchinson, <i>Principles of Plasma Diagnostics</i> , Cambridge University Press, 2005 U. Stroth, <i>Plasmaphysik</i> , 2. Auflage, Springer Spektrum, 2018 R. D. Hazeltine, F. L. Waelbroeck, <i>The Framework of Plasma Physics</i> , Perseus Books, 1998 F. F. Chen, <i>Introduction to Plasma Physics</i> , Plenum Press, 2nd edition, 1984.
Lehr- und Lernformen	Lecture (3 hours per week) Exercise (2 hours per week)
Arbeitsaufwand	45 hours lecture (attendance time)



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	30 hours exercise (attendance time) 105 hours self-study and exam preparation Total: 180 hours
Bewertungsmethode	The module assessment consists of a graded oral exam. Participation in the examination requires an ungraded academic work. Form, content and scope of the academic work will be announced at the beginning of the lecture.
Prüfungen	12079 Fundamentals of Plasma Physics 12080 Fundamentals of Plasma Physics (preliminary academic work)
Notenbildung	The module grade is equal to the examination grade.
Grundlage für	

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