P 1: Tutorial Plasma Physics (joint session AKjDPG/P)

Zeit: Sonntag 16:00–18:00 Raum: HS 3

Tutorium P 1.1 So 16:00 HS 3

Plasmas at atmospheric pressure: Overview on Physics and Applications — •Ronny Brandenburg — Leibniz-Institut für Plasmaforschung und Technologie e.V. (INP Greifswald) — Universität Rostock, Institut für Physik

Plasmas at atmospheric pressures are known from lightnings, but are also of great industrial importance. Technically they can be operated in many different electrode geometries, discharge regimes, and, with a great variety of their basic plasma parameters. In particular non-thermal as well as thermal plasmas exists at elevated pressures. While thermal plasmas are used for material processing (e.g. welding and spraying) and chemical conversion, non-thermal plasmas have been intensively studied in the context of surface treatment, environmental remediation, ozone generation, flow control, analytics, light sources and life-science applications. The first part of the tutorial will give an overview about the classification and application of plasmas at atmospheric pressure.

The research on atmospheric pressure non-equilibrium plasmas intensified over the last two decades leading to a large variety of plasma sources. Although the fundamental understanding of these discharges is emerging, there are still numerous unexplained phenomena in these complex plasmas. The properties of these plasmas span over a huge range of electron densities as well as heavy particle and electron temperatures. The second part of the tutorial will provide an overview of the key processes for its generation and stabilization as well as for their unique physical and chemical properties.

Tutorium P 1.2 So 17:00 HS 3

Introduction to High Temperature Plasma Physics — •Felix Warmer — Max-Planck-Institut für Plasmaphysik, Wendelsteinstraße 1, 17491, Greifswald

This introductory lecture explores the physics properties of the fourth fundamental state of matter: the plasma, i.e. the most common state of baryonic matter of the visible universe. Plasmas offer a plethora of interesting physics such as collective behaviour and long-range collisions owing to the Coulomb nature of the interaction. Of specific interest are high temperature plasmas as found in space as well as their artificial counterpart on earth for application to magnetic confinement fusion. High temperature plasmas, like in fusion devices, are also often magnetised adding a wealth of additional interesting effects – a considerable fraction of which is highly non-linear affecting plasma transport properties by more than an order of magnitude. In particular, plasma turbulence is a fascinating subject challenging our intellectual faculties and fascination. Based on these examples, this lecture will provide an introduction to the topic of high temperature plasma physics suited for students and physicists from other fields.