



Universität Hamburg

DER FORSCHUNG | DER LEHRE | DER BILDUNG

**CHAMPP**

CENTER IN HAMBURG FOR  
ASTRO-, MATHEMATICAL AND  
PARTICLE PHYSICS

**LECTURE COURSE IN THE QUANTUM UNIVERSE RESEARCH SCHOOL**

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Summer Term 2024

# Accelerator Physics II

W. Hillert

## Course Description:

Particle accelerators play an essential role in material research, high energy, hadron and nuclear physics, and are meanwhile indispensable tools serving various industrial and medical applications. In the course of related demanding challenges in accelerator operation and development, accelerator physics emerged as a stand-alone field of applied physics. The course will be a continuation of Accelerator Physics I and address this expanding and interesting research field on an advanced level.

Lecture contents: synchrotron radiation, radiative damping and equilibrium, low emittance lattices, 3<sup>rd</sup> and 4<sup>th</sup> generation synchrotron radiation sources, beam lifetime, colliders, luminosity optimization, phase space cooling, wigglers and undulators, free electron lasers.

It is planned to offer the traditional 4 days scientific excursion to European accelerator labs like GSI, PSI and CERN again this year. Updated information will be given in the lecture.

## Prerequisites:

Knowledge in electrodynamics, attendance of the introductory course Accelerator Physics I would be beneficial but is not recommended.

## Literature:

Will be discussed during the lecture.

**Date and Place:** Thu, 13:30–15:00, SemRm 1083, Bahrenfeld

**Problem Classes:** Thu, 15:15–16:45, SemRm 1083, Bahrenfeld

**Starting on:** 4 April 2024

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