U·H 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

Winter Term 2019/2020

Accelerator Physics I

B. Schmidt

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. After a brief history overview, the course will introduce the basic principles of different accelerator types. Main emphasis will be to elaborate the methods and concepts of transverse and longitudinal beam dynamics that are indispensable to understand and to design circular and linear accelerators.

Lecture contents:
- Historic overview
- Multipole magnetic fields
- Equation of motion, transverse plane
- Matrix formalism
- Transverse stability in circular accelerators
- Beam emittance
- Momentum deviation and dispersion
- Longitudinal dynamics in circular accelerators

Prerequisites:

Knowledge in electrodynamics.

Literature:

Will be discussed during the lecture.

Date and Place:	Thu, 13:30–15:00, Hörsaal III, Jungiusstr. 9
Problem Classes:	Thu, 15:15–16:45, Poolraum 1, Jungiusstr. 9
Starting on:	17 October 2019