PHYS-415  
Particle physics I
Shchutska Lesya

Summary
Presentation of particle properties, their symmetries and interactions. Introduction to quantum electrodynamics and to the Feynman rules.

Content
Introduction:
The Standard Model, a step toward the Grand Unification.
Particle detection, accelerators, natural radioactivity, cosmic rays. Particle physics and Astrophysics and Cosmology.
Relativity, equations of Klein-Gordon and Dirac.

Properties of particles:
Mass, charge, lifetime, spin, magnetic moment,....

Symmetries and conservation laws:
Invariance under space translation and rotation, parity, time reversal and charge conjugation. Violation of parity and CP, CPT theorem. Isospin.

QED:
Introduction to QED. The Feynman rules. The form factors.

Learning Prerequisites
Recommended courses
Nuclear and Particle Physics I and II, Quantum mechanics I and II

Learning Outcomes
By the end of the course, the student must be able to:
• Analyze sub-microscopical phenomena

Teaching methods
Ex cathedra and exercises in class

Assessment methods
oral exam (100%)

Resources
Websites

- http://lphe.epfl.ch/~bay