PHYS-411 **Physics of atoms, nuclei and elementary particles**

Nakada Tatsuya

Cursus	Sem.	Type
Ing.-phys	MA1, MA3	Opt.
Nuclear engineering	MA1	Opt.
Physicien	MA1, MA3	Opt.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
Exam	Oral
Workload	120h
Weeks	14
Hours	**4 weekly**
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Summary

In this lecture, symmetry and conservation law are applied to derive wave functions for elementary particles. Relativistic wave functions are analysed and applied for massive and massless particles. Different ideas on antiparticles are explored.

Content

- Introduction to general concepts commonly used in atomic, nuclear and elementary particle physics.
- Symmetry principles.
- Description of forces.
- Scaler, spinor and vector field
- Relativic wave function

Learning Prerequisites

Required courses

Quantum Mechanics
Electrodynamics
Special relativity

Recommended courses

Nuclear and particle physics

Important concepts to start the course

Symmetry and conservation
Lorentz invariance
Spin and statistics

Learning Outcomes

By the end of the course, the student must be able to:

- Sketch the basic concept of symmetry and conservation law
- Apply various hypothesises to a given problem

Transversal skills

- Assess one's own level of skill acquisition, and plan their on-going learning goals.

Teaching methods

Ex cathedra, exercises in class and assignment presentation

Expected student activities

Solving problems given as excersises

Assessment methods

Evaluating the Interaction during the courses

Resources

Notes/Handbook

Lecture notes and problems are haded out prior to the course