

# Physics beyond the standard model

## Lecturers

Thomas HAMBYE (Coordinator) and Michel TYTGAT

## Course mnemonic

PHYS-F469

## ECTS credits

5 credits

## Language(s) of instruction

English

## Course period

First term

## Campus

Plaine

## Course content

Standard Model: Brief reminder and Problems

Anomalies

Aspects of Effective Field Theory

Aspects of Grand Unified Theories

Neutrinos and Dark Matter

Aspects of Supersymmetry

## Objectives (and/or specific learning outcomes)

The general objective of this course is to build the necessary basis to study and develop models beyond the Standard Model of Particle Physics. The course will include both theoretical and experimental aspects.

## Pre-requisites and co-requisites

### Co-requisites courses

PHYS-F410 | Quantum field theory I | 5 crédits

### Required knowledge and skills

It is recommended to have followed lectures on group theory.

## Teaching method and learning activities

tablet lectures and slides

Supervised exercises

Personal project

## Contribution to the teaching profile

Constitute, develop and entertain aspects of fundamental physics.

Act as an autonomous scientific expert in solving problems

Communicate in an appropriate language in a scientific context and to a scientific public

## References, bibliography and recommended reading

An Introduction To Quantum Field Theory de Michael E. Peskin et Daniel V. Schroeder

Quantum Field Theory and the Standard Model de Matthew D. Schwartz

Gauge Theory of Elementary Particle Physics de Ta-Pei Cheng et Ling-Fong Li

extra bibliography will be provided during the course

## Other information

### Place(s) of teaching

Plaine

### Contact(s)

michel.tytgat AT ulb.be

## Evaluation method(s)

Other

### Evaluation method(s) (additional information)

Oral exam on the lectures and exercises

Personal project: in depth study of one aspect going beyond the material presented during the lectures: oral presentation at the exam

### Determination of the mark (including the weighting of partial marks)

Oral exam on the lectures and exercises (50%)

Personal project (50%): in depth study of one aspect going beyond the material presented during the lectures: abstract submitted before the exam and oral presentation at the exam

### Main language(s) of evaluation

English

### Other language(s) of evaluation, if applicable

French

## Programmes

Programmes proposing this course at the faculty of Sciences

MA-PHYS | **Master in Physics** | finalité Research/unit 2 and finalité Teaching/unit 2

