Advanced Quantum Field Theory

Lecturer
Glenn BARNICH (Coordinator)

Course mnemonic
PHYS-F417

ECTS credits
5 credits

Language(s) of instruction
English

Course period
First term

Campus
Plaine

Course content

Chapters of advanced quantum field theory. Choice from: Partition functions from canonical quantization. Path integrals in quantum statistical mechanics. Holomorphic methods. Partition function of massive scalar field. Casimir effect. Finite temperature Casimir effect and massless scalar partition function. Massless scalar in 1+1 dimensions and introduction to conformal field theory. 1-loop effective action and renormalization. Heat kernel and zeta function. Quantum gauge fields and BRST methods.

Objectives (and/or specific learning outcomes)

To gain familiarity with quantum field theory beyond S-matrix computations. Gain experience with advanced techniques of quantum field theory through a detailed study of selected applications.

Pre-requisits and co-requisits

Co-requisites courses

PHYS-F410 | Quantum field theory I | 5 crédits

Required knowledge and skills

PHYS-F410 Quantum Field Theory I
(PHYS-F440 Quantum Field Theory II)

Teaching method and learning activities

Ex-cathedra course + exercise sessions or personnel homework

Contribution to the teaching profile

Acquire advanced scientific expertise in a domain of physics. Understand the laws of nature through their formulation in quantum field theory.

References, bibliography and recommended reading

See bibliography in the course notes : http://homepages.ulb.ac.be/%7Egbarnich/QFT.pdf

Course notes

Syllabus

Other information

Place(s) of teaching

Plaine

Contact(s)

Glenn Barnich
<Glenn.Barnich@ulb.be>
http://homepages.ulb.ac.be/~gbarnich/

Evaluation method(s)

Oral examination

Evaluation method(s) (additional information)

Oral examination on the theoretical part and the exercise session including the presentation of a question that can be freely chosen.

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

The mark is entirely determined by the performance during the oral exam.

Main language(s) of evaluation

French and English

Programmes

Programmes proposing this course at the faculty of Sciences

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