

# Quantum Field Theory I

## Times:

Lectures:

Monday 12:00 - 13:30

Wednesday 12:00 - 13:30

Exercises:

Wednesday 14:00 - 15:30

Group A: Seminar Raum 6

Group B: Bibliothek AP

Please distribute yourselves evenly over the two groups, corrections might be made.

## Course homepage:

There will be a homepage. It may be found under: [www.desy.de/~boels/](http://www.desy.de/~boels/)

Contents should include this page, all exercises so far, rough idea of course contents so far, etc.

## Instructor:

lecturer: Junior Professor Dr. Rutger Boels

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Exercise session instructor: Martin Sprenger

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## Book(s):

There is a book. The course will be mostly based on chapters 1 - 7 ("Part I") from

Peskin & Schroeder, "An Introduction to Quantum Field Theory", Westview Press, 1995

This deals with the basics of Quantum Field Theory, working up to a first introduction to Quantum Elektrodynamics (QED). I want to stress I consider the content of the lectures and the exercises as the true basis of the exam.

There are many other books on quantum field theory. Some are good, others are better left alone. A good introductory, but slightly light book is Lewis Ryder's "Quantum Field Theory". It might make for good secondary reading.

A book I've been meaning to dig into deeper is Anthony Zee's "Quantum Field Theory in a Nutshell". However, I have no personal experience with it yet due to lack of time. In the same category of things-i-d-love-to-read-better: A set of lecture notes by David Tong, <http://www.damtp.cam.ac.uk/user/tong/qft.html>

The most far-out, but still useful book on Quantum Field Theory I know of is Warren Siegel's "Fields", available on-line at <http://insti.physics.sunysb.edu/~siegel/errata.html>. This book is really different and contains many non-standard techniques. It's free, electronic and therefore, as the author points out explicitly on his website, can't be eaten.

A set of books I'd advice you to stay away from for a first course is Weinberg's "The Quantum Theory of Fields". These are way beyond what we'll need.

Any further suggestions are welcome!

### **Exercises:**

There will be exercises, both from the Peskin and Schroeder book and handouts. The exercises will be listed on the homepage.

I would like to ask every time for two volunteers to sit together and \*write out\* a full solution to the problems. Scanned versions can then be uploaded to the webpage. This is meant as a service to your fellow students. You will get no bonus on the exam in return for this.

### **Bonus:**

You can earn a bonus. This can lead up to a 0.3 point increase on your exam. The bonus can be earned by handing in solutions to the exercises three times during the course. Your solutions will be graded. A positive grade (roughly > 50% correct over all exercises) earns the bonus. The bonus will only count for an exam in the 2013-2014 academic year.

Note: you are very welcome to work on the exercises in groups. Hand-ins however are only for \*one person\*! You need to demonstrate that \*you\* understand the problem as well as its solution. Too extensive similarities will not be tolerated.

### **Exam:**

There will be an exam. There will be a Nachklausur. For some reason we haven't been assigned dates & times & rooms yet for these.