

Instructor: Stefano Profumo
Office: ISB, Room 325
Phone Number: 831-459-3039
Office Hours: Wednesday 12:00 PM (or – better – by appointment)
E-mail: profumo@ucsc.edu
Course Web Page: http://scipp.ucsc.edu/~profumo/teaching/phys218_17/phys218.html

Lectures: Mondays and Wednesdays, 1:00 PM – 2:45 PM (includes 10' break)
Lecture Room: ISB, Room 235

Course Description

This course is the second quarter of a graduate-level introduction to relativistic quantum field theory (QFT). The focus is on non-abelian gauge theories and the Standard Model in particular.

Course Outline¹

1. The anomalous magnetic moment (17)
2. Path integrals (14)
3. Yang-Mills theory (25-26)
4. Spontaneous symmetry breaking (28)
5. Weak interactions (29)
6. Anomalies (30)
7. Precision tests of the Standard Model (31)
8. QCD and the parton model (32)

¹numbers in parenthesis indicate the corresponding chapter in Schwartz's book

“Recommended” Textbook

- *Quantum Field Theory and the Standard Model* by Schwartz
(1 day reserve)

Other Reference Textbooks

- *An Introduction to Quantum Field Theory* by Peskin and Schroeder
(1 day reserve)
- *Modern Quantum Field Theory* by Banks (1 day reserve)
- *Quantum Field Theory* by Srednicki
- *Quantum Field Theory* by Mandl and Shaw
- *The Quantum Theory of Fields: Foundations* by Weinberg
- *Quantum Electrodynamics* by Berestetskii, Lifshitz and Pitaevskii
- *Quantum Field Theory* by Itzykson and Zuber
- *Relativistic Quantum Mechanics* by Bjorken and Drell
- *A Modern Introduction to Quantum Field Theory* by Maggiore
- *Fields* by Siegal

Homeworks and Grading Policy

Grading will be based on homework exercises. Each homework will consist of typically a couple of exercises on the material discussed in class, or on complements to that material. The homework problems will be posted on the course web page during the quarter. After attempting each problem by yourself, you are encouraged to discuss the problems with the Instructor and with each other.

The final will consist on a presentation based on one of a few topics suggested by the Instructor.

Three interesting quotes

“Mr. Faulkner, some of your readers claim they still cannot understand your work after reading it two or three times. What approach would you advise them to adopt?”

William Faulkner: “Read it a fourth time”

“When I became a student of Pomeranchuk in 1950, I heard from him that the Book of Physics had two volumes: Volume one is “Pumps and Manometers”, volume two is “Quantum Field Theory”. (Lev Okun)

“QFT is sterile with respect to strong interactions and, like an old soldier, it is destined not to die, but just to fade away.”

(Geoffrey Chew, 1961)