Quantum Field Theory I (662), Fall 2022

Lectures: Tuesdays and Thursdays from 1:30pm to 2:45pm in PHYS201.

Instructor: Martin Kruczenski, e-mail:markru@purdue.edu, Office: PHYS274.

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Textbook: "An Introduction to Quantum Field Theory" by M. Peskin and D. Schroeder. Lecture notes will also available in the course webpage.

Course Webpage: `http://web.ics.purdue.edu/~markru/`

Homework: Every other week homework will be posted on the webpage. The deadline is one week after the problems are given. Homework is **graded**.

Exams: **No exams**.

Final grading: Final grade is based on **homework** (not all homeworks are worth the same, check the homework for its value).

Contents of the course

The intention is to go over parts I and II of the book. (Part III is for 663). Since that's a lot of material, some topics will be left for homework and others will be skipped. We will include

Ch. 2 Klein-Gordon (scalar) field.

Ch. 3 The Dirac Field.

Ch. 9 Path integrals in Quantum Mechanics and Quantum Field Theory.

Ch. 4 Interacting fields and Feynman diagrams.

Ch. 5, 6, 7 Scattering amplitudes, selected calculations in QED and pion physics.

Chs. 10,11 Selected topics on renormalization.

Ch. 12,13 Renormalization Group and Critical Exponents.

Ch. 13 The O(N) 3d model, IR fixed point, large N-limit, ϵ-expansion, critical exponents, introduction to Conformal Field Theory.