

PHYSICS 918

Instructor

Peisi Huang

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Student hours: By appointment

Class Hours

MWF 11:30:am - 12:20 pm, JH 245

Textbooks

Required:

Srednicki, *Quantum Field Theory*, Cambridge University Press

Optional:

Peskin and Schroeder, *An Introduction to Quantum Field Theory*

Schwartz, *Quantum Field Theory and the Standard Model*

Weinberg, *The Quantum Theory of Fields*, Volumes I and II

Course Description

This course will cover the foundation of quantum field theory, including path integrals, renormalizations, and symmetries. This course will also include an introduction to the Standard Model and Feynman diagram calculations.

Exams

Midterm: 3/6, 6:00 pm - 8:00 pm (no class during the regular class time.)

Course Project

A course project will be in place for the final exam. The projects are to be presented orally (20+5 min) at the end of the semester.

- Discuss your proposed topic with me. It does not have to be concrete, we will work it out together. Come to me by Feb 12.
- Initial choice of topic for the course project. First come, first serve, by March 4.

- Short-written proposal for the course project. Outline the calculation needed, and identify the major challenges compared to the course materials. (Optional) Discuss what you expect from what we have already learned. Due March 29.
- Oral Presentations of the project, in class from May 3 – May 17 (tentative).
- The written version of the project is due May 17.

All projects should include a one-page bibliography (containing references pertinent to the project). Submit it with your slides, and note/notebook to fill any gap in your calculation.

Homework Assignments

Homework will be assigned weekly and will be due approximately one week later. You are encouraged to discuss homework problems, but you **must** write down your own solutions. You must state clearly how you do the calculations in your homework. The lowest score will be dropped.

Grading

40% Midterm exam

30% Course project

30% Homework

AI Policy

The use of A.I. tools like Chat GPT is neither encouraged nor prohibited on assignments for this course. If you choose to use Chat GPT for assignments, please be sure to revise the content for clarity, conciseness, and audience awareness. Chat GPT is simply a tool and should not be used as a way to produce first and only drafts. Every assignment submission will be graded using the rubric provided in the syllabus. Be aware that Chat GPT may not develop high-quality work that earns a passing grade. It is your responsibility to review and revise all work before submitting to the instructor.

Within this class, you are welcome to use foundation models (ChatGPT, GPT, DALL-E, Stable Diffusion, Midjourney, GitHub Copilot, and anything after) in a totally unrestricted fashion, for any purpose, at no penalty. However, you should note that all large language models still have a tendency to make up incorrect facts and fake citations, code generation models have a tendency to produce inaccurate outputs, and image generation models can occasionally come up with highly offensive products. You will be responsible for any inaccurate, biased, offensive, or otherwise unethical content you submit regardless of whether it originally comes from you or an A.I. model. If you use an A.I. tool, its contribution must be acknowledged in the work you hand in, and you will be penalized for using A.I. without proper citation. Having said all these disclaimers, the use of foundation models is encouraged, as it may make it possible for you to submit assignments with higher quality, in less time. The university's policy on plagiarism still applies to any uncited or improperly cited use of work by other human beings, or submission of work by other human beings as your own.

University-wide policies and Resources

See <http://go.unl.edu/coursepolicies> for information on University-Wide Course Policies and Resources.