PHYS:5905:0042 Fall 2025 (Matheus Hostert)

Most of these texts will assume you are familiar with special relativity and quantum mechanics. For dark matter and cosmology, some basic general relativity is helpful. More advanced topics require quantum field theory.

This class does not require you to buy any of these books (some resources are free online) and the material will not follow any one particular book as we are aiming for an advanced undergraduate / early graduate level course. Please get in touch if you have any questions.

Basic textbooks and notes:

- **Modern Particle Physics** *Mark Thomson*

  Level: intermediate undergraduate and early graduate.
  Use for: foundation of particle physics and the SM.

- **Introduction to Elementary Particles** *David J. Griffiths*

  Level: intermediate undergraduate.
  Use for: foundation of particle physics, symmetries, Feynman diagrams, etc.

- **Concepts of Elementary Particle Physics** *Michael E. Peskin*

  Level: intermediate undergraduate.
  Use for: Same as above, but with more modern.

- **Fundamentals of Neutrino Physics and Astrophysics** *Carlo Giunti & Chung W. Kim*

  Available online
  Level: graduate.
  Use for: oscillation formalism, matter effects, sources & detection.

- **A Gentle Introduction to Neutrino Physics** *Pasquale D. Serpico*

  Link
  Level: advanced undergraduate / graduate.
  Use for: some concise notes for basics of neutrino physics.

- **Dark Matter 101: From Production to Detection** *David G. Cerdeño*

  Link
  Level: advanced undergraduate / graduate.
  Use for: dark matter production, direct and indirect searches.

More advanced:

- **Quarks and Leptons: An Introductory Course in Modern Particle Physics** *Francis Halzen & Alan D. Martin*

  Level: graduate.
  Use for: cross sections, parton model, electroweak phenomenology

- **An Introduction to Quantum Field Theory** *Michael E. Peskin & Daniel V. Schroeder*

  Level: graduate.
  Use for: canonical text for QFT, you may find some useful information there as well.