

Physics 461

Elementary Particles Fall Semester 2001

- Room:* Seaver Hall 109
Time: TF 11:00 AM - 12:15 PM
- Instructor:* Dr. Gabriele Varieschi
Office: Seaver Hall - 110
Phone: (310) 338-7632
E-mail: gvariesc@lmu.edu
Office hours: MW 10:00 AM - 12:00 noon; TF 10:15 AM – 11:00 AM, and by appointment.
Web page: <http://www.lmu.edu/acad/personal/faculty/gvariesc/>
- Required Text:* **Griffiths – Introduction to Elementary Particles – Wiley**
(we will try to cover almost all the chapters of this book)
- Tests:* There will be three tests during the semester. They will all count toward your final grade, so please try not to miss any of them. All tests and the final exam will be open-book.
- Test Dates:* 9/26 (Wed.), 10/31 (Wed.), and 11/28 (Wed.) (tentative dates).
- Oral Presentation:* A brief oral presentation (20-30 minutes) will be given by each student in the final week of the course. Students can choose any topic they like (theoretical, experimental, etc.) related to elementary particle physics.
- Final Exam:* TBA (Final exam week: Dec. 10-14), Seaver 109.
The final exam is cumulative and is equivalent to 2 tests (open-book).
- Homework:* Homework assignments will be given, typically one for each chapter of the book. Problem sets will be collected, graded, and will “influence” the final grade. Solutions to the problems will be reviewed in class, with student participation.
- Grading:*
- | | |
|-------------------|------|
| Test 1 | 15 % |
| Test 2 | 15 % |
| Test 3 | 15 % |
| Oral Presentation | 25 % |
| Final Exam | 30 % |
- Test Grading (approx.):* <50%=F; 50-54%=D; 55-69%=C range; 70-84=B range; >84=A range.

Have a good semester. Good luck !

Physics 461 – Bibliography

Introductory Books (at the level of Scientific American)

- Close, Marten, and Sutton – The Particle Explosion – Oxford University Press (*) The best-illustrated book of particle physics.
- Carrigan and Trower – Particles and Forces at the Hearth of Matter – Scientific American (*) A classical collection of readings from Scientific American.
- Solomey – The Elusive Neutrino – Scientific American Library (*) The illustrated story of the (still) most puzzling particle of all.

History of Particle Physics

- Weinberg – The discovery of Subatomic Particles – Freeman (*) A classic history, written by a Nobel Laureate.
- Cahn and Goldhaber – The Experimental Foundations of Particle Physics – Cambridge Reprints of all the fundamental papers of particle physics with extensive annotations. Mostly on the experimental side.
- Ezhela, et al – Particle Physics One Hundred Years of Discovery – AIP Press Year-by-year history, through the abstracts of the fundamental papers. A key reference book.

Experimental Particle Physics

- Perkins – Introduction to High Energy Physics – Addison Wesley (*) The most “classical” introduction to particle physics from the experimental, phenomenological side.
- Sundaresan – Handbook of Particle Physics – CRC Press A new reference book with an extended overview of particle accelerators and detectors.

Undergraduate level books

- Griffiths – Introduction to Elementary Particles – Wiley (*) Our textbook, already a classic one.
- Halzen and Martin – Quarks and Leptons – Wiley (*) Another good introduction written by two experts of the field.
- Kane – Modern Elementary Particle Physics – Addison Wesley (*) Another introduction centered more on the theory rather than the experiments.

More advanced – Graduate level books

- Mandl and Shaw – Particle Physics – Wiley
- Cottingham and Greenwood – An Introduction to the Standard Model of Particle Physics (*)
- Cheng and Lee – Gauge theory of elementary particle physics

Quantum Field Theory

- Mandl and Shaw – Quantum Field Theory – Wiley
- Peskin and Schroeder – An Introduction to Quantum Field Theory (*)
- Weinberg - The Quantum Theory of Fields – Vol. I-II-III – Cambridge (*)

(*) Available at the LMU Library.

Websites

- <http://pdg.lbl.gov/>
The Particle Data Group web page, where you can order for free *The Review of Particle Physics* (both in booklet and full review forms), which is the “Bible” of the particle physicist. You should get a copy of this. Many other interesting links.
- <http://particleadventure.org/>
The Particle Adventure. A leading educational site.
- <http://www.aps.org/>
The American Physical Society. See the many interesting links.
- <http://cern.web.cern.ch/CERN/>
CERN European Laboratory for Particle Physics.
- <http://www.slac.stanford.edu/>
Stanford Linear Accelerator Center.
- <http://www.fnal.gov/>
Fermi National Accelerator Laboratory.
- <http://www.desy.de/html/home/index.html>
DESY in Germany.
- <http://www.bnl.gov/>
Brookhaven National Laboratory.
- <http://www.lngs.infn.it/>
Gran Sasso Italian Laboratory.
- <http://www.kek.jp/>
KEK in Japan.
- http://www.slac.stanford.edu/spires/experiments/online_exp.html
A comprehensive list of experiments in particle physics.
- <http://www-hfm.mpi-hd.mpg.de/CosmicRay/CosmicRaySites.html>
A comprehensive list of experiments linking particle physics to astrophysics and cosmology.
- <http://www-spires.dur.ac.uk/>
The Durham (UK) High-Energy-Physics database.
- <http://www-spires.slac.stanford.edu/find/hep>
The leading search engine for hep papers.
- and many others...