

The Standard Model

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Lecture Distribution

Part 1 QCD

- Lecture 1: QCD intro
- Lecture 2: QCD Lagrangian and Symmetries
- Lecture 3: Asymptotic freedom
- Lecture 4: QCD in e^+e^-
- Lecture 5: DIS and the parton model
- Lecture 6: Radiative correction and PDF evolution
- Lecture 7: QCD in hadronic collisions
- Lecture 8: Parton Showers and Monte Carlo simulations
- Lecture 9: Jet Reconstruction

Part 2 QCD

- Lecture 10: Gauge Theories and Spontaneous Symmetry Breaking
- Lecture 11: Fermions and mass generation
- Lecture 12: The Higgs Field
- Lecture 13: Anomaly Cancellation and CKM
- Lecture 14: Neutrino Masses
- Lecture 15: Renormalizability
- Lecture 16: Higgs Phenomenology

Material

- Useful resources:

M. E. Peskin and D. V. Schroeder, “An introduction to quantum field theory,” Reading, USA: Addison- Wesley (1995).

R. K. Ellis, W. J. Stirling and B. R. Webber, “QCD and collider physics,” Camb. Monogr. Part. Phys. Nucl. Phys. Cosmol. 8, 1 (1996).

C. P. Burgess and G. D. Moore, “The standard model: A primer,” Cambridge, UK: Cambridge Univ. Press (2007).

J. Rojo, “The Strong Interactions and LHC phenomenology”, lecture notes available online at <http://juanrojo.com/teaching>

P. Nason, “Introduction to QCD”, lecture notes available online at <http://moby.mib.infn.it/~nason/misc/QCD-intro.ps.gz>

G. Zanderighi, “QCD and collider physics”, lecture notes available online at <http://www2.physics.ox.ac.uk/sites/default/files/QCDLectures.pdf>

- Lecture notes on the different topics will appear in the website

<https://www2.physics.ox.ac.uk/contacts/people/casalderreysolana>

Assessment

- ⦿ 3 problem sets to be handed in in weeks 5,6 and 8.
- ⦿ Solutions will be discussed in three problem classes. The course teaching assistant is Luca Rottoli, who will contact you for setting dates and times
- ⦿ Handing in work and attending the problem classes is compulsory for **MMathPhys students**. All others are also welcome to follow them.
- ⦿ The problem sets will appear in my website this week.

Course Schedule

	Tuesday 10-11	Thursday 15-16	Friday 12-13
Week 1	x		x
Week 2			
Week 3	x	x	x
Week 4	x	x	x
Week 5	x		x
Week 6	x		x
Week 7	x		x
Week 8	x	x	