Quantum Chromodynamics at LHC

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1 Proton structure and Parton Showers

- Asymptotic Freedom and running coupling
- Branching Probabilities
- DGLAP eqn and form of parton distributions
- Sudakov form-factor and MC program
- Angular ordering and coherent branching

2 Calculation of hard scattering cross sections

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- W production
- NLO cross sections and Subtraction method
- W+jet production at the LHC
- Combining NLO cross sections and parton showers
- $t\bar{t}$ and single top production at the LHC

References

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

[2] S. Catani and M. H. Seymour, Phys. Lett. B **378** (1996) 287 [arXiv:hep-ph/9602277].

[3] S. Frixione and B. R. Webber, "Matching NLO QCD computations and parton shower simulations," JHEP **0206**, 029 (2002) [arXiv:hep-ph/0204244].