QCD and Collider Physics

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This lecture course aims to discuss the main applications of Quantum Chromo-Dynamics (QCD) to collider physics, proving an introduction to perturbative calculations and resummation techniques.

1. An introduction to Collider Phenomenology
   - Colliding particles
   - The parton model and the Drell-Yan process
   - Breit-Wigner and Narrow Width Approximation
2. Quantum Chromo-Dynamics
   - An introduction to perturbative QCD
   - Radiative corrections to the Drell-Yan process
   - DGLAP evolution equations
3. Resummation
   - Factorisation in the soft and collinear limits
   - Infra-Red and Collinear safety
   - The transverse momentum of the Z boson
4. Jet Physics
   - Why jets?
   - Jet definitions
5. Jet substructure
   - Grooming and tagging algorithms
   - Machine Learning techniques in jet physics