

Quantum Chromodynamics (QCD) a high energy physics point of view

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4 weeks, 4 hours per week including final seminar

- Brief review of the particle physics concepts relevant to this course.
- The Deep Inelastic Scattering and the Structure of the proton; Quarks and Parton Distribution Functions.
- QCD. The local gauge principle; Colour; Quarks and Gluons; Colour confinement; Running of the coupling constant and asymptotic freedom; electron-positron annihilation; Colour factors; Heavy mesons and the colour potential.
- QCD inspired models: the Monte Carlo generators
- Tests of QCD at lepton colliders; implications of Colour in the final state; jets; observation of QCD interference effects; fragmentation and hadronization.
- Tests of QCD at hadron colliders; customised jet reconstruction algorithms; the jet cross-sections; the Multiple Parton Interactions (MPI), the Double Parton Scattering (DPS); Minimum Bias (MB) and Underlying Event (UE) measurements.
- QCD in the interactions of Heavy Ions, the Quark Gluon Plasma (QGP); QCD in the early universe.

SEMINAR: "Results from LHC have shown that the underlying event produced by multi-parton interactions (MPI) in pp and pA collisions have a much richer structure than previously expected. It exhibits flow like phenomena, such as ridges, and strangeness production increase with the charged particle multiplicity. Many effects are known from large collisional systems where they are understood in terms of Quark-Gluon Plasma properties, but there might be alternative ways to model these effects in small collision systems. What is the status of the art of these studies?"

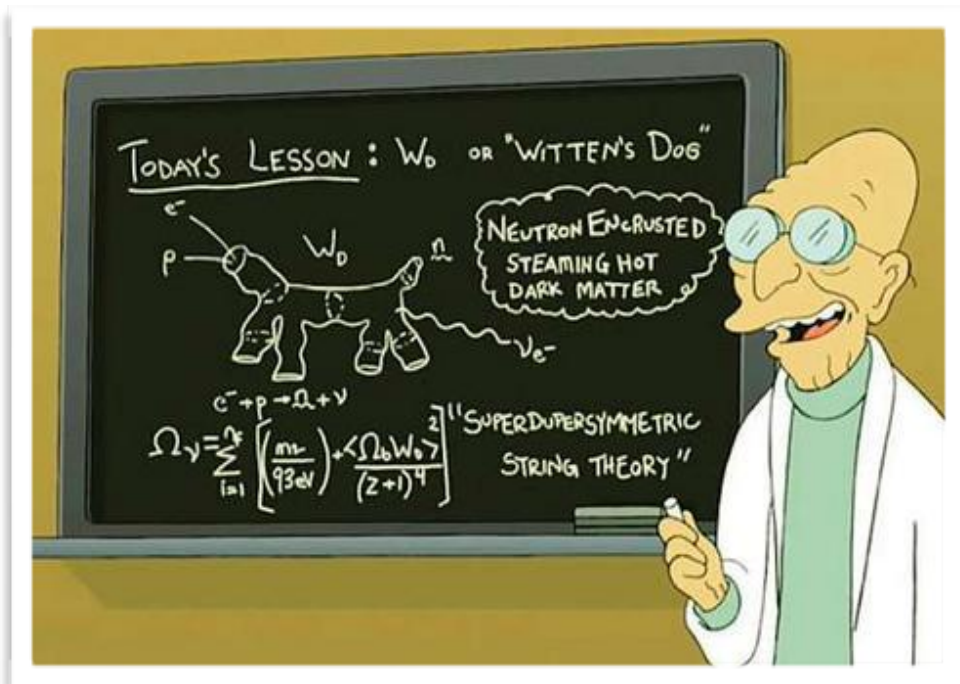
Textbook - "Modern Particle Physics", Mark Thomson

SCHEDULE - AULA F

MON	12/02/2018	5-7 PM
WED	14/02/2018	9-11 AM
MON	19/02/2018	2-4 PM
WED	21/02/2018	9-11 AM
MON	26/02/2018	2-4 PM
WED	28/02/2018	9-11 AM
MON	05/03/2018	2-4 PM
WED	07/03/2018	9-11 AM
(SEMINAR) **		

The 2 hours periods include two breaks of 15 minutes each

** If needed the seminar can be moved to the afternoon of the same day



per informazioni: Livio Fanò