Venerdi 20 Febbraio 2015, ore 15:00, Aula Wataghin

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High-energy (low-x) QCD evolution

The LHC data offer many new opportunities to investigate quantum chromodynamics at high energies. The latter regime is particularly interesting theoretically, since it is a regime in which the interacting hadrons appear as dense states of partons, whose dynamics is governed by non-linear evolution equations. In this talk, we will review QCD evolution at small-x in the framework of the simple and elegant formulation provided by the color dipole model, which is able to incorporate both linear evolution and high-density effects.
We will start by explaining the formulation of deep-inelastic scattering observables in the dipole model, and by discussing the simplest relevant evolution equation in this case, the so-called Balitsky-Kovchegov equation. We will then turn to a few observables in proton-nucleus collisions (broadening, di-jets, total multiplicity).
We will show in particular how, for these observables, the event-by-event fluctuations of the parton densities play an essential role in the high-energy regime.