Soutenance de thèse de doctorat

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Vendredi 04/09/2020, 14:00-17:00

Orme des Merisiers Amphi Claude Bloch, Bât. 774

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IPhT

Jet evolution in a dense QCD medium

To probe the properties of the quark-gluon plasma created in heavy-ion collisions, a very useful class of observables refers to the propagation of energetic jets. A jet is a collimated spray of particles generated via successive parton branchings, starting with a virtual quark or gluon produced by the collision. When such a jet is produced in the dense environment of a nucleus-nucleus collision, its interactions with the surrounding medium lead to a modification of its properties, phenomenon known as jet quenching. In this thesis, we develop a new theory to describe jet quenching. We compute for the first time the effects of the medium on multiple vacuum-like emissions, that is emissions triggered by the virtuality of the initial parton. We present a new physical picture for jet evolution, with notably a factorization in time between vacuum-like emissions and medium-induced emissions. This picture is Markovian, hence well suited for a Monte-Carlo implementation that we develop in the parton shower `JetMed`. We then investigate the phenomenological consequences of our new picture on jet observables and especially the jet nuclear modification factor R_{AA}, the SoftDrop z_g distribution and the jet fragmentation function. Our Monte-Carlo results are in good agreement with the LHC measurements.