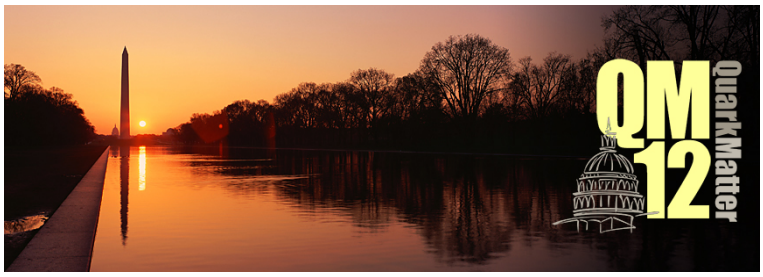

Contribution ID: **246** Type: **Poster**

Monte Carlo simulation studies of the elastic energy loss of high-energy gluons and light quarks in a strongly interacting medium

Thursday, 16 August 2012 16:00 (2 hours)

A strong suppression of heavy-flavor hadrons has been seen in ultrarelativistic heavy ion collisions at BNL-RHIC and CERN-LHC. This surprising result has challenged the view of gluon radiation dominating over elastic 2-to-2 processes as a cause of parton energy loss in a quark-gluon plasma. To study the effectiveness of elastic collisions as the suppression mechanism in detail, we have developed a sophisticated Monte Carlo simulation describing the non-eikonal propagation of high-energy gluons and light quarks interacting with the quarks and gluons from the expanding QCD medium. The partonic collision rates are computed in leading-order perturbative QCD, while four different scenarios are used to model the QCD medium: 1) a simple static model for case studies of energy loss probability distributions; 2) (1+1)-dimensional hydro with initial conditions from the EKRT model for modeling the central heavy ion collisions; 3) (2+1)-dimensional hydro with a smooth sWN profile obtained from the optical Glauber model for non-central collisions; and 4) event-by-event hydro with an eBC profile from the Monte Carlo Glauber model for a detailed study of the initial state density fluctuation effects.

We compare our results with the neutral pion suppression observed in sqrt(s_NN)=200 GeV Au+Au collisions at RHIC and charged hadron suppression in sqrt(s_NN)=2.76 TeV Pb+Pb collisions in the LHC. We find that a model with purely incoherent collisions is not supported by the experimental data. In addition, the initial state density fluctuations are not observed to have a significant effect on the elastic energy loss.

Primary author: AUVINEN, Jussi (University of Jyväskylä)

Co-authors: HOLOPAINEN, Hannu; ESKOLA, Kari J. (University of Jyvaskyla); RENK, Thorsten (University of Jyväskylä)

Presenter: AUVINEN, Jussi (University of Jyväskylä)

Session Classification: Poster Session Reception

Track Classification: Jets