



Contribution ID: 191

Type: not specified

## Jet quenching and charmonia suppression at high- $p_T$ from effective quenching model

*Tuesday, 27 August 2019 15:30 (30 minutes)*

Understanding the energy loss of partons traversing the strongly interacting matter created in heavy ion collisions is one of key goals of the heavy ion physics program. After a brief introduction to the field and explaining connections of heavy ion physics and high-energy QCD physics, we present results of phenomenological analyses of various recent jet quenching data. The core of the model used in these analyses is based on the shift formalism which allows for an extraction of the magnitude of parton energy loss from the data with minimal assumptions on the underlying physics mechanisms. The model accurately reproduces jet  $R_{AA}$  and its  $p_T$  and rapidity dependence, shape of the modification of fragmentation functions observed in the data and, consequently, the  $R_{AA}$  of charged particles. The analysis of recent data on splitting functions and fragmentation functions allows for further constrains on the role of coherence effects in the parton energy loss. Further, the analysis of charmonia suppression using this model points to a remarkable similarity between the quenching of light-quark-initiated jets and the prompt charmonia suppression. This may bring an insight into both the suppression mechanism and general aspects of charmonia formation which is still not well understood.

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**Session Classification:** Workshop on Heavy Ion Physics