

The nuclear modification factor of D and B mesons in a field fluctuating quark-gluon plasma at LHC energies

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The main goal of the ongoing relativistic heavy-ion collision experiments is to study the possible hot and dense deconfined state of QCD matter produced in such high energy collisions called Quark-Gluon-Plasma (QGP). In order to study the QGP, we need to probe it. High energy partons are produced in initial partonic subprocesses in the collisions between two heavy nuclei. The Heavy quarks are mostly produced at the early stage of the collisions from the initial

fusion of the partons which makes them a good probe to study the QGP. Immediately after their production, these heavy quarks will travel through the dense QGP medium and will start losing energy by elastic collisions and bremsstrahlung gluon radiations. These energy loss calculations are usually obtained by considering the QGP medium in an average manner and

statistical field fluctuations of the QGP medium are ignored. Since the QGP is a statistical system of mobile color charge particles, one could characterize it by stochastic electromagnetic field fluctuations. The effect of this field fluctuations in the QGP leads to an energy gain of the travelling heavy quarks of all momenta and significant at the lower ones. We have calculated the nuclear modification factor (R_{AA}) of D and B mesons by considering

the collisional and radiative energy loss of charm and beauty quarks along with the energy gain due to field fluctuations. Our results are in good agreement with the experimentally measured R_{AA} of D and B mesons by ALICE and CMS experiments at $\sqrt{s_{NN}}=2.76$ TeV and $\sqrt{s_{NN}}=5.02$ TeV.

Teaser (will appear on the printed program)

Is the story of heavy mesons suppression complete without considering the energy gain by heavy quarks due to field fluctuations? We try to explore this issue.

Primary author: SHEIKH, Ashik Iqbal (Variable Energy Cyclotron Centre, Department of Atomic Energy)

Co-authors: Prof. MUSTAFA, Munshi Golam (Saha Institute of Nuclear Physics); Dr AHAMMED, Zubayer (Variable Energy Cyclotron Centre, Department of Atomic Energy)

Presenter: SHEIKH, Ashik Iqbal (Variable Energy Cyclotron Centre, Department of Atomic Energy)

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