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Constraining quark and gluon jet energy loss distributions in quark-gluon plasma using Bayesian inference

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QCD factorization allows us to model the jet energy-loss in A-A collisions as a convolution between the jet cross section in p-p collisions and an energy loss distribution. Meanwhile, Bayesian inference provides a data-driven way of constraining the energy loss distribution parameterization. Only a few efforts have been made in this direction, and solely using untagged jets. However, gluon and quark jets are known to loose energy differently. By discriminating them, we distinguish the energy loss distributions of each parton-jet and arrive at a different set of parameters for each. This allows for a more universal model that can be used for prediction in other jet measurements where quark/gluon ratio is different. A form for the energy loss distribution is chosen in the soft scattering approximation and the Markov Chain Monte Carlo method is then employed to estimate the parameters. The jet suppression obtained from the extracted energy loss distribution for inclusive jets show good agreement with measured one. However, it is sensitive to the collision energy. This might be caused by a poor constraining power of only relying on inclusive jets. We show the improvement by including photon tagged jets to the analysis.

With this study, we hope to achieve a better and more constrained modeling of the jet energy loss distribution, as well as to retrieve insights on how current theoretical models can improve by adding more insight from measurements.

Declaration

I certify that I have checked that I am authorised to submit the abstract with the listed co-authors with their current affiliations

Change of Speaker

I understand that change of speaker is allowed provided that no participant gives more than one talk. Otherwise, we will ask the speaker to choose between one or the other abstract to be presented.

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