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Multivariate sensitivity analysis of jet substructure observables to quenching

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The modification of the substructure of jets due to interactions with a hot QCD medium, the quark-gluon plasma, can be used to study the properties of this medium. Due to the nature of a jet, as a composite object of multiple particles, there are many observables one could construct and study. There is no indication that a single observable will be sufficient to understand the interaction of the parton shower with the hot QCD medium. We investigate how the correlation of jet observables is affected by jet quenching. The medium effect on this correlation is quantified using the Kullback-Leibler divergence and a principle component analysis. We also consider the experimental constraints and the influence of the large uncorrelated background present in heavy-ion collisions on the measurement of these observables. We present a framework in which all these ingredients are combined to determine which correlation of observables can be best used to constrain the medium-jet modification while being robust against the large underlying event. As the framework is fully data driven it can easily be deployed on heavy-ion data from RIHC and LHC experiments.

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