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Energy-energy correlators of heavy and light flavor jets in heavy-ion collisions

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Energy-energy correlators (EECs) have been proposed as excellent jet substructure observables for studying the space-time structure of the jet shower and disentangling the different properties of the quark-gluon plasma. The EEC distributions of charged hadron jets, D-tagged and B-tagged jets from PYTHIA 8 exhibit that the EEC of heavy meson jets in small angle is much smaller than that of charged hadron jets. Within a linear Boltzmann transport model which includes both elastic and inelastic interactions between jet partons and medium constituents, we explore the contributions from energy loss, jet-induced medium response and medium-induced gluon radiation to the the final EEC distribution of both heavy and light flavor jets at different angles. Comparing to pp result, the energy correlation between shower partons are suppressed at the whole region of angles due to energy loss. After combining the contributions from medium response and radiated gluons, the total correlators get enhanced at both large angles and very small angles. The enhancement at large angles comes from the correlations between shower partons and medium response, while the enhancement at very small angles comes from the correlations between shower partons and radiated gluons. Within this framework, we provide the medium-modified EEC for charged hadron jets, D-tagged jets and B-tagged jets in Pb+Pb collisions at 5.02 TeV. The effect of hadronization process on EEC distribution will also be discussed.

Category

Theory

Collaboration

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