



Contribution ID: 556

Type: **Oral**

Probing jet modification in the QGP using N-Point Energy Correlators in Pb-Pb collisions with ALICE

Monday 7 April 2025 18:20 (20 minutes)

In heavy-ion collisions, jets propagating through the quark-gluon plasma undergo interactions with the medium. These interactions modify the internal structure of jets, making jet substructure an invaluable tool for probing the microscopic properties of the QGP. N-point Energy Correlators, defined as energy-weighted N-particle correlations inside jets, have emerged as a novel substructure observable in proton-proton collisions, where they show a clear separation of perturbative and non-perturbative effects. Recent measurements in Pb-Pb and p-Pb collisions show striking modifications of the Energy-Energy Correlators (EECs) compared to vacuum QCD baselines.

In this talk we present a measurement of the EECs in Pb-Pb collisions, presenting results at low jet transverse momentum for the first time. Such a measurement is essential in mapping jet modification across different kinematic regimes in the QGP. In addition we present the first measurements of the 3-point Energy Correlator in Pb-Pb collisions, along with their ratios to the EECs. This higher order correlator is predicted to have an enhanced sensitivity to medium effects such as the medium response and offers unique insights into the interactions of the jet and the plasma.

Category

Experiment

Collaboration (if applicable)

ALICE

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Session Classification: Parallel session 5

Track Classification: Jets