

The 9th International Symposium on Heavy Flavor Production in Hadron and Nuclear Collisions



Contribution ID: 12

Type: **not specified**

Flavor Hierarchy of Jet Energy Correlators inside the Quark-Gluon Plasma

Heavy flavor jets provide ideal tools to probe the mass effect on jet substructure in both vacuum and quark-gluon plasma (QGP).

Energy-energy correlator (EEC) is an excellent jet substructure observable owing to its strong sensitivity to jet physics at different scales.

We perform a complete realistic simulation on medium modification of heavy and light flavor jet EEC in heavy-ion collisions.

A clear flavor hierarchy is observed for jet EEC in both vacuum and QGP due to the mass effect.

The medium modification of inclusive jet EEC at different angular scales exhibits very rich structure: suppression at intermediate angles, and enhancement at small and large angles, which can be well explained by the interplay of mass effect, energy loss, medium-induced radiation and medium response.

These unique features of jet EEC are shown to probe the physics of jet-medium interaction at different scales, and can be readily validated by upcoming experiments.

Within this framework, we also provide a good description of the CMS data on the modification of inclusive jets' EEC in Pb-Pb collisions.

[1] Wen-Jing Xing, Shanshan Cao, Guang-You Qin and Xin-Nian Wang, arXiv:2409.12843

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