

# Quark Matter 2019 - the XXVIIIth International Conference on Ultra-relativistic Nucleus-Nucleus Collisions



Contribution ID: 160

Type: Oral Presentation

## Flavor hierarchy of jet quenching in relativistic heavy-ion collisions

*Tuesday, 5 November 2019 15:40 (20 minutes)*

Relativistic heavy-ion experiments have observed similar quenching effects for (prompt)  $D$  mesons compared to charged hadrons for transverse momenta larger than 6-8 GeV, which remains a mystery since heavy quarks typically lose less energies in quark-gluon plasma than light quarks and gluons. Recent measurements of the nuclear modification factors of  $B$  mesons and  $B$ -decayed  $D$  mesons by the CMS Collaboration provide a unique opportunity to study the flavor hierarchy of jet quenching. Using a linear Boltzmann transport model combined with hydrodynamics simulation, we study the energy loss and nuclear modification for heavy and light flavor jets in high-energy nuclear collisions. By consistently taking into account both quark and gluon contributions to light and heavy flavor hadron productions within a next-to-leading order perturbative QCD framework, we obtain, for the first time, a satisfactory description of the experimental data on the nuclear modification factors for charged hadrons,  $D$  mesons,  $B$  mesons and  $B$ -decayed  $D$  mesons simultaneously over a wide range of transverse momenta (8-300 GeV). This presents a solid solution to the flavor puzzle of jet quenching and constitutes a significant step towards the precision study of jet-medium interaction. Our study predicts that at transverse momenta larger than 30-40 GeV,  $B$  mesons also exhibit similar suppression effects to charged hadrons and  $D$  mesons, which may be tested by future measurements.

Reference:

[1] Wen-Jing Xing, Shanshan Cao, Guang-You Qin, and Hongxi Xing, arXiv:1906.00413

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**Session Classification:** Parallel Session - Heavy flavor II

**Track Classification:** Heavy flavor and quarkonium