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Production of W/H+jets in Relativistic heavy-ion collisions

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Gauge boson associated with jet production is a perfect channel for jet quenching. Z+jet and γ +jet correlations have already been investigated by several theory models and experimental groups in both p+p and Pb-Pb collisions at $\sqrt{s} = 5.02$ TeV. However, W+jets are dominated by quark jet and H+jet are mainly gluon jet, the comparison of W+jet and H+jet would provide complementary information of jet quenching.

In the talk, we report a systematic calculation of W/H+jet production in Pb-Pb collisions at the LHC including jet quenching effects in the QGP. In the model, a nice baseline description of W+jet in p+p is achieved by utilizing Sherpa, a Monte Carlo event generator which combines the NLO with resummation by a matched parton shower (PS), and the parton energy loss in hot/dense QCD medium is simulated by Linear Boltzmann Transport(LBT) model.

We make predictions for the first time for the modifications of W/H+jet events due to jet-medium interactions: the modification of the distributions of events as a function of the vector sum of the lepton and jets $|\vec{p}_T^{Miss}|$, which is enhanced in small $|\vec{p}_T^{Miss}|$ region and suppressed in large $|\vec{p}_T^{Miss}|$ region due to jet energy loss in the opposite direction of the W boson. This observable can be easily observed in experimental and provide new information of jet quenching. While $|\vec{p}_T^{Miss}|$ is significantly broadened in PbPb collisions for H+jet event. Furthermore, we have investigated the shift of W/H+jet p_T imbalance distribution x_{jV} , the suppression of jet yield per W/H trigger R_{jV} and the modification of W/H+jet azimuthal angle correlations $\Delta\phi_{jV}$ as Z+jets, multi-jets have important contributions in small $\Delta\phi_{jV}$ and x_{jV} phase space and the differences between W/H+jet and Z+jet will be discussed. We find that, H have much less jet partners and the tagged jet has smaller energy, but they loss the same fraction of its energy. What's more, we extended the Webber hadronization model to Pb+Pb collisions, with which we can make nice descriptions on the jet profile and jet fragmentation function both in p+p and Pb+Pb collisions.

Collaboration (if applicable)

Track

Electroweak Probes

Contribution type

Contributed Talk

Primary authors: Mr ZHANG, Shan-Liang (Central China Normal University); WANG, Xin-Nian (Central

China Normal University (China) / Lawrence Berkeley Na); ZHANG, Ben-Wei (Central China Normal University)

Presenter: Mr ZHANG, Shan-Liang (Central China Normal University)

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