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Nuclear modification of jet shape for inclusive jets and γ -jets at the LHC energies

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With our coupled jet-fluid model [1, 2, 3], we study the nuclear modifications of full jets and jet structures for single inclusive jets and γ -jets in Pb+Pb collisions at 5.02 ATeV and 2.76 ATeV. The in-medium evolution of full jet shower is described by a set of coupled transport equations including the effects of collisional energy loss, transverse momentum broadening and medium-induced splitting process. The dynamical evolution of bulk medium is simulated by solving relativistic hydrodynamic equation with source term which accounts for the energy and momentum deposited by hard jet shower to soft medium. Our study demonstrates that the hydrodynamic medium response to jet propagation significantly enhances the broadening of jet shape at large angles and is essential for the cone-size dependence of jet energy loss and nuclear modification factor of inclusive jet production. It is also found that the nuclear modification pattern of jet shape is sensitive to jet energy but has weak dependence on the flavor of the parton that initiates the jet. Our result can naturally explain the different nuclear modification patterns of jet shape functions for single inclusive jet and γ -jet events as observed by the CMS Collaboration, and can be tested in the future by measuring the jet shape function over a wider range of jet energies in heavy-ion collisions.

Reference:

- [1] Ning-Bo Chang, Guang-You Qin, Phys.Rev,C94,024902 (2016)
- [2] Yasuki Tachibana, Ning-Bo Chang and Guang-You Qin, Phys.Rev,C95,044909 (2017)
- [3] Ning-Bo Chang, Yasuki Tachibana and Guang-You Qin, Phys.Lett,B801,135181 (2020)

Collaboration (if applicable)

Track

Jets and High Momentum Hadrons

Contribution type

Contributed Talk

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