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Nuclear modification of full jets and jet structure in relativistic nuclear collisions

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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 jet, dijet and gamma-jet events in relativistic heavy-ion collisions. The evolution of full jet shower is studied via 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 the bulk medium is simulated via hydrodynamic equation with source terms which describe the energy and momentum deposited from hard jet to soft medium. Our detailed analysis indicates that collisional absorption (energy loss) tends to narrow the jet shape function while transverse momentum kicks and medium-induced radiations broaden the jet transverse profile. Also, jet-induced flow plays a significant contribution to jet shape function and dominates at large angles away from the jet axis. The final nuclear modification pattern for the jet shape function is a combined effect from various jet-medium interaction mechanisms. Our detailed studies for single inclusive jets, dijets and gamma-jets for various kinematics indicate that the nuclear modification of jet shape has strong jet energy and flavor dependence: the inner core of lower energy (gluon) jets is easier to be modified by jet-medium interaction than higher energy (quark) jets.

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, Guang-You Qin, Yasuki Tachibana, in preparation

Summary

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