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Interference effect between jet-induced flows in dijet events

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We investigate the hydrodynamic medium response to jets in the quark gluon plasma (QGP) fluid in dijet events, in particular focusing on the interference effect between the flows induced by a back-to-back pair of jets. In high-energy heavy-ion collisions, jets deposit their energy and momentum into the QGP medium fluid via the successive interactions with the medium constituents during their propagation. The deposited energy and momentum are supposed to excite the medium fluid, and induce flows following the jets as hydrodynamic medium responses. The flow induced by the highly quenched jet develops very widely in the QGP fluid, and can affect also the medium response contribution to the structure of the opposite-side jet in dijet events.

We simulate dijet events in high-energy heavy-ion collisions by employing a coupled jet-fluid model combining jet shower transport equations and hydrodynamic equations with source terms [1]. The jet shower transport equations describe the evolution of the momentum distributions of partons in the jet showers with the medium effects, i.e., collisional energy loss, transverse momentum broadening, and medium-induced radiation. The QGP medium evolution is described by (3+1)-dimensional ideal hydrodynamic equations with source terms which transfer the energy and momentum deposited by the jet pair to the QGP fluid. We study how the interference effect between the jet-induced flows in dijet events come out in the jet-correlated particle distributions in the final state and their dependence on the event selection and background subtraction method. For the extensive studies, we also study the energy momentum deposition and induced flows by heavy quarks or jets with virtuality-ordered splittings.

Reference

[1] Y. Tachibana, N.-B. Chang, G.-Y. Qin, "Full jet in quark-gluon plasma with hydrodynamic medium response,"Phys. Rev. C 95, 044909 (2017)

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