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The effect of initial fluctuations on jet quenching

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The effect of initial fluctuations on partonic jet energy loss in a hydrodynamical background in high-energy heavy-ion collisions is studied within a next-to-leading order (NLO) perturbative QCD parton model. An energetic parton jet is found to lose more energy loss with fluctuating initial conditions than that with smooth initial conditions due to initial dominative positive correlation between the fluctuation of the production probability of the initial parton jet and the fluctuation of the local medium density in the jet trajectory. The deviation between the nuclear modification factors with fluctuating initial conditions and smooth initial conditions in non-central A+A collisions is found greater than in central A+A collisions. Particularly, the jet energy loss with linear path-length dependence is found to encounter more stronger fluctuation effect than with quadratic path-length dependence.

Primary author: Dr ZHANG, Hanzhong (Institute of Particle Physics, Central China Normal University)

Co-authors: Prof. KO, Che-Ming (Cyclotron Institute, Texas A&M University); Dr SONG, Taesoo (Cyclotron Institute, Texas A&M University)

Presenter: Dr ZHANG, Hanzhong (Institute of Particle Physics, Central China Normal University)

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