

Punching-through Jets in $A + A$ Collisions at RHIC/LHC Energy

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Based on previous study[1], punching-through jets are studied within a NLO pQCD parton model with jet quenching taken into account in high energy $A + A$ collisions. The spatial transverse distributions of the initial parton production points that contribute to the final high p_T single hadron/dihadron spectra are compared between RHIC and LHC energy. The fraction of the dihadron yield contributed by punching-through parton jets is found to increase with the transverse momenta of dihadron, especially at LHC energy. The azimuthal anisotropy v_2 of the dihadron spectra are studied in non-central $A + A$ collisions. It is found to be larger than the single hadron v_2 . The dihadron v_2 is found to be also larger at LHC than RHIC energy because of the much more punching-through jets at LHC. Punching-through jets are created from the central system region where initial partons participating in strong interaction should be associated with stronger shadowing effects than those initial partons in the outer layer of the system, and therefore these punching-through jets also manifest a strong shadowing effect. These punching-through jets have a number fraction big enough to cause an observation of the difference of shadowing effects given by different shadowing parameterizations (EKS98[2], nDS[3], nPDF[4], Hijing[5]) in dihadron spectra at LHC energy, while a small number fraction of punching-through jets result in an absentation in dihadron spectra at RHIC and in single hadron spectra at RHIC/LHC.

References

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