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Deformation of Jets Induced by Ambient Medium Flow

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The evolution of jets showers in high energy nuclear collisions is influenced in various ways by the presence of a surrounding medium. The interaction of jet constituents with the medium can happen during the partonic stage of the jet, during hadronization, and even during its hadronic stage. We will demonstrate how flow of the ambient medium in a direction transverse to the jet can introduce both dipole and quadrupole deformations. We analyze the corresponding $n=1$ and $n=2$ harmonic deformations of the transverse structure of jets using the method of Q -vectors. We discuss how the harmonic coefficients and their preferred angles evolve when the ambient environment of jets changes from the vacuum to a parton medium without flow and finally to a medium with various rates of transverse flow. We have conducted a systematic study using both partonic and hadronization effects of the medium on jets. While quadrupole deformations are naturally present even in the vacuum, we find that the existence of sizable dipole deformations, and a correlation of the angles of dipole and quadrupole deformations could constitute clear experimental signals for the presence and size of transverse flow.

Category

Theory

Collaboration

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