Monte Carlo simulation studies for unfolding hadron-in-jet multiplicity measurements at STAR

Roy Salinas for the STAR Collaboration
Abilene Christian University, USA
rxs15b@acu.edu

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Abstract

Hadronic jets are among the most striking phenomena seen in high energy physics, but the conversion of scattered quarks and gluons into hadrons remains mysterious. The multiplicities of hadrons in jets have been proposed as a way to gain a deeper insight into fragmentation functions, in particular for the gluon. The STAR experiment at Brookhaven National Lab has long used spin asymmetries in jet production to constrain such things as gluon helicity. Recent studies have made use of spin asymmetries of pions within jets to investigate transversity and the Collins fragmentation function. Unpolarized hadron-in-jet measurements can lead to new information such as better constraints on the gluon fragmentation function and a clearer picture of the transverse momentum distribution of hadrons within jets. Producing accurate multiplicity measurements requires a multi-dimensional unfolding to correct for effects such as bin migrations for which Monte Carlo simulations have proven to be an effective tool. The status of a Monte Carlo analysis will be shown, along with a discussion on possible unfolding techniques.