

STAR Measurements of the Shared Momentum Fraction z_g using Jet Reconstruction in p+p and Au+Au

Tuesday, 7 February 2017 14:20 (20 minutes)

Within the overwhelming majority of models, light quark and gluon jet quenching in heavy ion collisions is described as resulting predominantly from pQCD-type gluon radiation, but details of the underlying mechanisms differ greatly. One key difference lies in the treatment of the Altarelli-Parisi, AP, splitting functions. While in some models, such as Q-PYTHIA, the splitting functions are directly modified in the medium, this core component remains unchanged in others (e.g. YaJEM). The *shared momentum fraction* z_g was shown to be a Sudakov-safe measurement of the splitting function [1].

This quantity measures the p_T ratio between the two dominant branches as determined by the SoftDrop grooming process.

An inclusive measurement of z_g in p+p collisions at top RHIC energy will be presented.

The focus of our Au+Au results will be on a comparative study to p+p using the specific di-jet selection introduced in our previous momentum imbalance measurement, i.e. jets geometrically matched to “hard core” jets found using only constituents above 2 GeV/ c and with a high tower above 5.5 GeV. Such di-jet pairs were found to be significantly imbalanced with respect to p+p, yet regained balance when all soft constituents were included. Individual examination of the splitting behavior of leading and recoil jet adds a new dimension to this observation, and new input to energy loss models.

[1] A. J. Larkoski, S. Marzani and J. Thaler, Phys. Rev. D 91, 111501 (2015)

Preferred Track

Jets and High pT Hadrons

Collaboration

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Session Classification: Parallel Session 3.4: Jets and High pT Hadrons (III)

Track Classification: Jets and High pT Hadrons