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Space-time geometry of small and large collision systems

Jet suppression has long been considered a signal for QGP formation in A-A nuclear collisions. Conventional approaches include a classical Glauber model to estimated number of nucleon participants Npart and N-N binary collisions Nbin. A spectrum ratio RAA incorporating Nbin and assuming hard-component (jet-related hadrons) factorization is intended to measure the extent of high-pt jet suppression in A-A relative to p-p. The same approach applied to smaller collision systems (p-Pb) returns nontrivial but ambiguous results. Detailed analysis of p-Pb spectra reveals that classical Glauber Monte Carlos substantially overestimate Npart and Nbin. An alternative method based on ensemble-mean pt data is compatible with spectrum data. Several spectrum features call into question assumed hard-component (jet) factorization implicit in the RAA definition and reveal the importance of "exclusivity" (a projectile nucleon can only interact with one target nucleon *at a time*) and relativistic time dilation. An updated version of a two-component spectrum model (TCM) isolates complete spectrum hard components (jet fragments) down to low hadron pt without assuming factorization. Revised TCM analysis provides surprising new results and places p-Pb and Pb-Pb systems within a common descriptive context.

Author: TRAINOR, Thomas

Presenter: TRAINOR, Thomas

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