

Examining the relationships between charged-particle spectra and event centrality in oxygen-oxygen collisions using the STAR detector at RHIC

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1 High energy collisions of heavy ions form a relativistic hydrodynamic fluid
2 called the Quark Gluon Plasma (QGP). Central collisions, collisions that have
3 a small impact parameter, produce larger volumes of QGP than peripheral col-
4 lisions with a larger impact parameter. One way of studying the QGP is by
5 comparing the momentum spectra of charged particles in central and periph-
6 eral collisions. Traditionally at the Solenoidal Tracker at RHIC (STAR) ex-
7 periment, centrality is determined via charged particles at mid-rapidity within
8 the Time Projection Chamber (TPC). This measure of centrality could suffer
9 from auto-correlation if the charged-particle spectra are measured in the same
10 phase space. To mitigate this effect, centrality can also be estimated using the
11 charged-particle multiplicity measured in the Event Plane Detector (EPD), cov-
12 ering a pseudorapidity range of $2.1 < |\eta| < 5.1$. This poster will compare the
13 charged-particle momentum distribution ratios obtained by using the two dif-
14 ferent methods of estimating collision centrality in oxygen-oxygen collisions at a
15 center-of-mass collision energy of 200 GeV per nucleon pair. Such a comparison
16 will help us explore the inherent correlations between particle production across
17 different regions of a heavy ion collision.