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Constituent quarks and systematic errors in midrapidity charged multiplicity ($dN_{\rm ch}/d\eta$) distributions.

Although it was demonstrated more than 13 years ago that the
increase in midrapidity $dN_{\rm ch}/d\eta$ with increasing centrality
of Au+Au collisions at RHIC was linearly proportional to the number
of constituent quark participants (N_{qp}) in the collision,
it was only in the last few years that generating the spatial positions of the
three quarks in a nucleon according to the Fourier transform of the measured electric
charge form factor of the proton could be used to connect $dN_{\rm ch}/d\eta/N_{qp}$ as a function
of centrality in p(d)+A and A+A collisions with the same value of $dN_{\rm ch}/d\eta/N_{qp}$
determined in p+p collisions. The several calculations had slightly different methods.
One calculation, which only compared its calculated
$dN_{\rm ch}/d\eta/N_{qp}$ in p+p at $\sqrt{s_{NN}} = 200$ GeV to the least central of 12 centrality
bin measurements in Au+Au by PHENIX, claimed that the p+p value was higher by "about 30\%" from
the band of measurements vs. centrality and suggested a smaller number of subnuclear contributors, e.g.
quark-diquark. However the clearly quoted systematic errors were ignored for which a 1 standard deviation
systematic shift would move all the 12 Au+Au data points to within 1.3 standard deviations of the p+p value,
or if the statistical and systematic errors are added in quadrature a difference of 35 ± 21\% .
The PHENIX method gives a difference of 19$\pm$18\%.

Preferred Track

Initial State Physics and Approach to Equilibrium

Collaboration

Not applicable

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