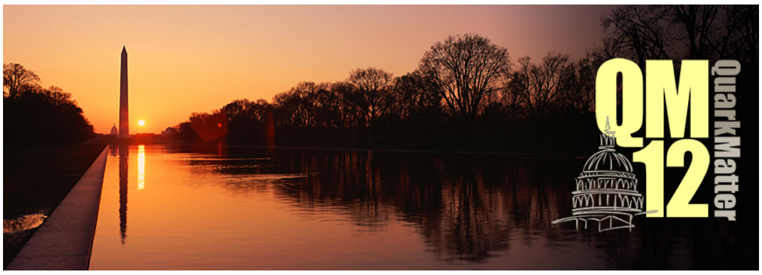

Contribution ID: **361** Type: **Poster**

Why the formula meandN$_{ch}^{AA}/d\eta =$ meandN$_{ch}^{pp}/d\eta[xN_{part}/2 + (1-x)N_{coll}]$ should be deprecated

Thursday, 16 August 2012 16:00 (2 hours)

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{\large \bf{ Why the formula\\
$meandN_{\rm ch}^{AA}/d\eta =$
$meandN_{\rm ch}^{pp}/d\eta[xN_{\rm part}/2 + (1-x)N_{\rm coll}]$\\ should be deprecated}}

\bs
Abstract for Quark Matter 2012 poster
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The fact that the multiplicity density in A+A collisions increases faster than the number of participants has led to the popular formula
$meandN_{\rm ch}^{AA}/d\eta =$
$meandN_{\rm ch}^{pp}/d\eta[xN_{\rm part}/2 + (1-x)N_{\rm coll}]$ with the implication that point-like hard-scattering contributes to the total charge multiplicity or $\sum E_T$ distributions. For $\sqrt{s} = 630$ GeV $\bar{p} - p$ collisions, the UA2 collaboration~\cite{UA2PLB165} measured that the hard-scattering component of $\sum E_T$ distributions only becomes apparent at the level of $\sim 1/500$ the total cross-section, clearly indicating that the contribution of hard-process to the multiplicity and $\sum E_T$ distributions is negligible. The universal behavior of
$meandN_{\rm ch}^{AA}/(0.5N_{\rm part}d\eta)$ as a function of $N_{\rm part}$ at RHIC and LHC over the range $7 \leq \sqrt{s_{NN}} \leq 2760$ GeV, in spite of the dramatic increase in the ratio of $N_{\rm coll}/N_{\rm part}$ due to the increasing N-N interaction cross section, is another indication. Finally, an E_T distribution which satisfies the popular formula for
$meandN_{\rm ch}^{AA}/d\eta$ will be demonstrated and shown to look nothing like any measured $\sum E_T$ distribution. A more reasonable nuclear geometrical description has been given previously~\cite{Voloshin,De,Nouicer} and will be tested with recent data.

\begin{thebibliography}{9}
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\bibitem{Nouicer} R. Nouicer, \Journal{\EPJC}{49}{281}{2007}.
\end{thebibliography}
\end{document}

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Session Classification: Poster Session Reception

Track Classification: Global and collective dynamics