XXIV QUARK MATTER DARMSTADT 2014

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Number of Quark Participant Scaling of $\langle dN_{ch}/d\eta \rangle$ and $\langle dE_T/d\eta \rangle$ with Centrality for 200 GeV d+Au Collisions and Au+Au Collisions from 7.7 to 200 GeV

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The dependence of charged particle production and transverse energy production in relativistic heavy ion collisions has been comprehensively studied as a function of $\sqrt{s_{NN}}$ from 7.7 to 200 GeV and centrality represented as the average number of nucleon participants, $\langle N_{part} \rangle$, in the collision. The general trend of the data exhibits a decrease in the value of $\langle dN_{ch}/d\eta \rangle$ and $\langle dE_T/d\eta \rangle$ at mid-rapidity normalized by the number of participant pairs as $\langle N_{part} \rangle$ decreases. However, it has been demonstrated that identified particle flow data scales with the number of constituent quarks over a large range of collision energies, so the number of quark participants may be a more appropriate scaling variable for particle production. The average number of quark participants, $\langle N_{qp} \rangle$, as a function of centrality is estimated using a modified Glauber model that replaces each nucleon participant with quark participants. This estimate is then used to investigate the N_{qp}-scaling of $\langle dN_{ch}/d\eta \rangle$ and $\langle dE_T/d\eta \rangle$ using PHENIX data for 200 GeV d+Au collisions and for Au+Au collisions at $\sqrt{(s_{NN})} = 200$, 62.4, 39, 27, 19.6, and 7.7 GeV with special emphasis on the validity of scaling with $\langle N_{qp} \rangle$ at the lower energies.

On behalf of collaboration:

PHENIX

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