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Transverse energy distributions at mid-rapidity in p+p, d+Au, and Au+Au collisions at $\sqrt{s_{NN}}$ =62.4–200 GeV and implications for particle production models

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Measurements of the midrapidity transverse energy distribution $dE_T/d\eta$, are presented for p+p, d+Au, and Au+Au collisions at 62.4–200 GeV. The E_T distributions are compared with the number of participants, $N_{\rm part}$, the number of binary collisions, $N_{\rm coll}$, and the number of constituent-quark participants, N_{qp}, calculated from a Glauber model. For Au+Au, $(dE_T/d\eta)/N_{\rm part}$ indicates that the two component ansatz $dE_T/d\eta$ $(1-x)N_{\rm part}/2 + xN_{\rm coll}$, which has been used to explain E_T distributions is simply a proxy for N_{qp}, and that the $N_{\rm coll}$ term does not represent a hard-scattering component in E_T distributions. The $dE_T/d\eta$ distributions of Au+Au and d+Au are then calculated from the measured p+p E_T distributions using two models (additive quark model and the number-of-constituent quarks model) that both reproduce the Au+Au data. However, the number-of-constituent-quark-participant model agrees well with the d+Au data, while the additive quark model does not. A description of the various models and their implications will be discussed.

On behalf of collaboration:

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