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Violations of geometric scaling in the production of high-pT jets in 200 GeV d+Au collisions with the PHENIX detector

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Recent measurements of high-p_{T} jet and dijet production in centrality-selected proton–lead collisions at the LHC are observed to grossly violate geometric models of the relationship between jet production at mid-rapidity and soft particle production in the nuclear fragmentation region. These modifications have been, variously, attributed to the suppression of soft gluons in proton configurations with a high Bjorken-x, taken as a direct observation of proton color fluctuations, or interpreted as the result of a rapidity-separated energy conservation between soft and hard processes. This poster reports the measurement of high-p_{T} jet production in 200 GeV deuteron–gold and proton–proton collisions by the PHENIX experiment at RHIC. Fully corrected invariant yields and spectra are presented for jets at mid-rapidity covering the wide kinematic range 12 GeV/c $< p_{\mathrm{T}} <$ 50 GeV/c. The nuclear modification factor $R_{d\mathrm{Au}}$ for minimum bias collisions is consistent with unity. However, the centrality-selected $R_{d\mathrm{Au}}$ shows substantial deviations from unity, with a qualitative pattern similar that observed at the LHC albeit at a smaller p_{T}. These measurements provide crucial new information for understanding the anomalous relationship between hard and soft processes in p/d+A systems.

On behalf of collaboration:

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