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Long-Range Rapidity Correlations in Heavy-Light Ion Collisions DOUGLAS E. WERTEPNY, YURI V. KOVCHEGOV, Department of Physics, The Ohio State University, Columbus, OH 43210, USA — We study two-particle longrange rapidity correlations arising in the early stages of heavy ion collisions in the saturation/Color Glass Condensate framework. We calculate the two-gluon production cross section while including all-order saturation effects in the heavy nucleus with the lowest-order rescattering in the lighter nucleus. We find four types of correlations in the two-gluon production cross section: (i) geometric correlations, (ii) HBT correlations accompanied by a back-to-back maximum, (iii) away-side correlations, and (iv) near-side azimuthal correlations which are long-range in rapidity. The geometric correlations (i) are due to the fact that nucleons are correlated by simply being confined within the same nucleus. Long-range rapidity correlations (iii) and (iv) have exactly the same amplitudes along with azimuthal and rapidity shapes: one centered around  $\Delta \phi = \pi$  with the other one centered around  $\Delta \phi = 0$ (here  $\Delta \phi$  is the azimuthal angle between the two produced gluons). We thus observe that the early-time CGC dynamics in nucleus-nucleus collisions generates azimuthal non-flow correlations which are qualitatively different from jet correlations by being long-range in rapidity.

> Douglas E. Wertepny Department of Physics, The Ohio State University, Columbus, OH 43210, USA

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