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Initial Conditions from Gluon Multiplicity in Heavy Ion Collisions PATRICK CARZON, JACQUELYN NORONHA-HOSTLER, MATTHEW SIEVERT, Rutgers University — A great uncertainty in heavy-ion collisions is the initial state immediately after the collision. A question remains regarding the optimal method of determining the energy density deposited at mid-rapidity by a collision. This is important because the viscosity of the quark-gluon plasma is very small, and the final-state flow will be sensitive to this choice in the initial state. TRENTO accomplishes this in a phenomenological way by taking $\sqrt{T_A T_B}$ to provide a reduced thickness function, that when scaled by a data-determined factor provides an entropy density. Another way of calculating the initial energy density is using a proportionality to $T_A T_B$, which comes from Color-Glass Condensate calculations at $\tau = 0$. I will present a new method of calculating the reduced thickness using the single-inclusive gluon cross section in the dilute-dense limit of the CGC framework. There is a noticeable difference, across system size, between observables in the standard setting of TRENTO and this new method. We also study quantitatively various approximations which are commonly made in such calculations. The gluon distribution employed here provides a platform on which to later introduce new conserved charges into hydrodynamics when supplemented by quark splitting functions.

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