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Momentum dependence of light nuclei production in p-p, p-Pb and Pb-Pb collisions at the LHC

We study the momentum dependence of the production of light nuclei in high energy collisions in the nucleon coalescence/recombination mechanism.

We derive formulas of the momentum distributions of deuterons and helions.

We obtain the analytic expressions of the coalescence factor B_A (B_2 for d and B_3 for He) as functions of the collision system size and the momentum.

We apply the deduced results to p-p, p-Pb and Pb-Pb collisions to naturally explain the interesting behaviors of B_A observed in experiments at the CERN Large Hadron Collider.

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