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Collisions in AdS: the road to experiments

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Holography has been used for a while as a strongly coupled approach to study the initial stage of heavy-ion collisions. As holographic calculations cannot directly describe QCD, importantly neglecting any weak-coupling effects, it is an interesting question how well these studies fit experimental data. Here, we will focus on longitudinal dynamics, modeled by colliding shock waves in AdS.

These collisions give a surprisingly universal rapidity profile, where the shape at high collision energies is completely independent of the energy or longitudinal structure of the colliding shocks. It is somewhat complicated to compare this initial profile to the final measured rapidity profile, but we can compute the entropy and thereby make an estimate of the total multiplicity. The result indicates that our infinite coupling profile has somewhat more stopping than in real heavy-ion collisions, which is most likely because of neglecting weak-coupling effects. We finally comment on (future) consequences for real nucleus-nucleus and proton-nucleus collisions.

References: arxiv:1312.2956 and 1305.4919 (PRL 111)

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