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Entropy production in classical Yang-Mills system from color-glass condensate initial condition with noise

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Possible thermalization mechanism in heavy-ion collisions is explored in classical Yang-Mills (CYM) theory with the initial condition of color-glass condensate with noise varied. We calculate the Lyapunov exponents and show that even a tiny noise triggers instability of the system and then a chaotic behavior sets in as described by the positive Lyapunov exponents, or Kolmogorov-Sinai (K-S) entropy, which would take a saturate value after a characteristic time dependent on the ratio of strengths of the noise to the background coherent fields.

Thus we see that the entropy production is achieved in CYM theory with a realistic initial condition of relativistic heavy-ion collisions.

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