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Plasma instabilities and particle production in Glasma

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Plasma instabilities play important roles in thermalization processes of relativistic heavy-ion collisions. We study early-stage instabilities of non-Abelian plasma on the basis of two-particle irreducible(2PI) formalism. In this presentation, We focus on Nielsen-Olesen instability caused by homogeneous but time dependent color magnetic field. For this purpose, We perturbatively solve equations of motion of gluon fields and Schwinger-Dyson (Kadanoff-Baym) equation simultaneously up to 1-loop level.

Our results imply that exponential growth of unstable modes directly leads to explosive particle production. Furthermore, the longitudinal fluctuation of gluon fields is found to generate secondary instabilities of all momentum modes in an analytic way.

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