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Parametric instabilities in nonexpanding and expanding geometries

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We investigate parametric instabilities of classical gluon fields in nonexpanding and expanding geometries.

Plasma instabilities play an important role in thermalization.

Since the glasma initial condition consists of longitudinally polarized color-flux tubes, possible instabilities should reflect this background.

Recently, classical gluon fields in a nonexpanding geometry are found to show parametric instability under a longitudinally polarized background with homogeneous intensity [1].

The growth rates of low momentum modes are large enough compared with other instabilities proposed so far.

The rapid growth is caused by the spin-magnetic field interaction.

Surprisingly, parametric instability survives even in an expanding geometry [2].

We introduce the conformal coordinates which enable us to map an expanding problem into a nonexpanding problem.

We find that fluctuations with finite longitudinal momentum can grow exponentially due to the suppression of effective momenta coming from the longitudinal expansion.

We also discuss the relevance of the parametric instability to the early stage dynamics.

[1] S. Tsutsui, H. Iida, T. Kunihiro and A. Ohnishi, Phys. Rev. D91, 076003 (2015)

[2] S. Tsutsui, T. Kunihiro and A. Ohnishi, in preparation

On behalf of collaboration:

NONE

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