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Early-stage entropy production in the semiclassical approximation

Understanding early thermalization is a theoretical challenge in relativistic heavy ion collisions and semiclassical treatment is valid in the relevant stage. In this work, we investigate thermalization process by using Husimi-Wehrl (HW) entropy defined by Husimi function which is a coarse-grained quantum distribution function. We propose numerical methods to calculate the semi-classical time evolution of the HW entropy and succeed in a numerical evaluation of the HW entropy in Yang-Mills field theory, using a product ansatz for the Husimi function, which is examined to give only 10-20 per cent over estimate. We show the HW entropy production from the initial condition around the phenomenological configurations given by McLerran-Venugopalan model, and discuss the relation to the isotropization of the pressure.

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