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Husimi-Wehrl entropy in the quantum chaotic system -An efficient calculational method- HIDEKAZU TSUKIJI, YITP, Kyoto U, HIDEAKI IIDA, TEIJI KUNIHIRO, Dept. Phys, Kyoto U, AKIRA OHNISHI, YITP, Kyoto U, TORU T. TAKAHASHI, Gumma College of Technology — Early thermalization in heavy ion collisions still remains a theoretical challenge. It was suggested in the hydrodynamical analyses of the relativistic heavy-ion collisions at RHIC and later at LHC. There are many proposals for pinning down the underlying mechanism for it. Quantum fluctuations on top of the classical configurations (glasma) are found to induce instabilities. It may trigger the chaotic behavior of the gauge field and eventually give rise to entropy production. In this work, we investigate thermalization of glasma by using the Husimi-Wehrl entropy. Quasi-distribution function defined in phase space should be useful to describe possible chaotic behavior of a quantum system. We adopt the Husimi distribution function to discuss entropy production of quantum systems. Husimi function is a minimally coarse-grained Wigner function and semi-positive definite. As a first stage of the study, we calculate the Husimi-Wehrl (H-W) entropy of a quantum Yang-Mills system[Tsai, Muller(2012)] with two-degrees of freedom. We propose a Monte-Carlo method to numerically calculate the time evolution of the Husimi function and the H-W entropy. We also discuss an extension of the method to quantum field theories.

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