Abstract Submitted
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Lattice study of ratios between Israel-Stewart parameters YASUHIRO KOHNO, MASAYUKI ASAKAWA, MASAKIYO KITAZAWA, Osaka University, CHIHO NONAKA, Nagoya University, SCOTT PRATT, Michigan State University — Navier-Stokes equations are known as hydrodynamic equations which take account of effects of dissipations, i.e. the viscosities and heat conductivity. There are, however, problems in the relativistic Navier-Stokes equations, i.e. the equations violate causality. Israel-Stewart equations, which evade the problems of Navier-Stokes equations by introducing new parameters, such as relaxation times, have recently been used in describing the space-time evolution of the quark-gluon plasma produced in high energy heavy ion collisions. The viscosities and relaxation times are related to each other by imposing entropy constraints on the system. According to Boltzmann-Einstein principle, the probability distribution of the fluctuation in energy-momentum tensor is related to the entropy of the system. Applying this principle to the entropy in Israel-Stewart theory, one can obtain the ratios of the viscosities to the relaxation times. We evaluate the ratios of the viscosities to the relaxation times in SU(3) lattice gauge theory. This analysis reduces the number of phenomenological parameters that appear in Israel-Stewart equations.

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