Abstract Submitted
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Freeze-out dynamics of expanding quantum meson clouds[1]
YOSHIAKI ONISHI, TETSUO MATSUI, Institute of Physics, University of Tokyo, Komaba — We construct kinetic equations for self-interacting meson fields in a manifestly covariant form in order to describe the boost invariant expansion in the freeze out stage of the relativistic nucleus-nucleus collision. We employ the two-time Wigner functions in order to ensure manifest covariance. The equations of motion for two times are obtained in terms of the Wigner functions. We eliminate the off-diagonal elements of the Wigner functions from these equations in the long wave approximation and derive a closed form of kinetic equations for the diagonal component of the Wigner functions. The result is a manifestly covariant form of the kinetic equations. We show that this construction is equivalent to perform a local Bogoliubov transformation to the particle creation/annihilation operators taking into account the local change of the mass parameter due to the space-time dependent self-energy. These equations together with the non-linear Klein-Goldon equation for meson condensates form a closed set of equations. We show that these equations lead to essentially the same results to the collective excitation of the system near equilibrium as obtained using one-time Wigner functions. We construct a boost invariant solutions of these kinetic equations in order to describe the expansion of meson cloud.

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