Thermal photons in QGP and non-ideal effects

Content :

We investigate the thermal photon production-rates using one dimensional boost-invariant second order relativistic
hydrodynamics to find proper time evolution of the energy density and the temperature. The effect of bulk-viscosity and
non-ideal equation of state are taken into account in a manner consistent with recent lattice QCD estimates.
It is shown that the \textit{non-ideal} gas equation of state i.e $\varepsilon-3\,P\,\neq 0$ behaviour of the expanding plasma,
which is important near the phase-transition point, can significantly slow down the hydrodynamic expansion and
thereby increase the photon production-rates. Inclusion of the bulk viscosity may also have similar effect on the hydrodynamic evolution.
However the effect of bulk viscosity is shown to be significantly lower than the \textit{non-ideal} gas equation of state.
We also analyze the interesting phenomenon of bulk viscosity induced cavitation making the hydrodynamical description
invalid. It is shown that ignoring the cavitation phenomenon can lead to a very significant over estimation of the photon flux.
It is argued that this feature could be relevant in studying signature of cavitation in relativistic heavy ion collisions.

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