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Probing quark gluon plasma through the radial flow of the thermal electromagnetic radiations

Content :

It has been shown that the transverse momentum (p_T) distribution of the thermal photons and the lepton pairs may be used simultaneously to estimate the radial velocity of different phases of the matter formed in nuclear collisions at ultra-relativistic energies. The kinematic variables (e.g.,) the invariant mass of lepton pairs (M) and the p_T can be chosen judiciously to estimate the flow velocities in the partonic and hadronic phases of the evolving matter. We observe a non-monotonic variation of the flow velocity with invariant mass of the lepton pair which is indicative of two different thermal sources at early and late stages of the dynamically evolving system for SPS, RHIC and LHC energies. Various inputs required for the theoretical calculations have been constrained from the experimental data wherever available. Within the ambit of the present analysis we argue that the variation of the radial velocity with invariant mass is indicative of a phase transition from initially produced partons to hadrons at SPS and RHIC energies.

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