Production of Quarks and Gluons in Heavy-Ion Collisions at Ultra-Relativistic Energies at RHIC and LHC

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Abstract

Their are indications that processes in ultra-high energy heavy-ion collisions at RHIC and LHC are ruled by scales introduced by the presence of large space-time dependent chromofields. We address the production of quarks and gluons from a classical non-constant field via vacuum polarization within the framework of the background field method of QCD. In this context, we derive expressions for the propability of production and source terms, i.e. the propability of production per unit time and per unit volume of the phase space, for quarks and gluons. These source terms are needed in selfconsistent non-abelian relativistic transport calculations for the description of the production and the equilibration of the quark-gluon plasma at RHIC and LHC.