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Thermalization and quark production in spatially homogeneous system of gluons

We present a full set of the Boltzmann Equation in Diffusion Approximation (BEDA) for studying thermal equilibration and quark production in a system of quarks and gluons. With BEDA, we analyse the evolution of spatially homogeneous system initially populated bu gluons. We observe that soft partons, dominantly produced via medium-induced radiation, rapidly fill a thermal distribution with an effective (time-dependent) temperature and an effective Baryon chemical potential during the entire process. If quark production is not allowed, the thermalization is achieved after three distinct stages in the under-populated scenario, meanwhile it only requires of two phases for over-populated systems. When quarks appear in the calculation, the thermal evolution of the system is parametrically identical. In this case, quarks are produced initially due to $g \leftrightarrow q\bar{q}$, and $gg \leftrightarrow q\bar{q}$ will appear later in the evolution as a relevant process.

Authors: WU, Bin; SALGADO LOPEZ, Carlos Albert (Universidade de Santiago de Compostela (ES)); BARRERA CABODEVILA, Sergio (Instituto Galego de Física de Altas Enerxías - Universidade de Santiago de Compostela)

Presenter: BARRERA CABODEVILA, Sergio (Instituto Galego de Física de Altas Enerxías - Universidade de Santiago de Compostela)

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