

# 10th International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions



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## Local Thermalization of Gluons in a Nonlinear Model

*Tuesday, June 2, 2020 7:30 AM (1h 20m)*

Analytic solutions of a nonlinear boson diffusion equation (NBDE) with schematic initial conditions account for the fast local equilibration of gluons in relativistic heavy-ion collisions. The exact solutions are achieved through a nonlinear transformation that was proposed in Ref. [1], but in addition, include the singularity at  $\epsilon = \mu < 0$ , and boundary conditions at the singularity. As a consequence, the analytic time-dependent solutions asymptotically approach the Bose-Einstein distribution not only in the UV, but also in the IR. Calculations are performed with a local equilibration time of  $\tau_{\text{eq}} \simeq 0.1 \text{ fm}/c$  and a local temperature of the order of 600 MeV in the initial stages of Pb-Pb collisions at energies reached at the Large Hadron Collider (LHC). The nonlinear NBDA solutions are suited to replace the conventional linear relaxation-time approximation that enforces equilibration from the initial nonequilibrium to the thermal distribution.

[1] G. Wolschin, Physica A 499, 1 (2018), and preprint (2020).

### Collaboration (if applicable)

### Track

Initial State

### Contribution type

Contributed Talk

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