



Contribution ID: 31

Type: Oral presentation

Thermalization of non-abelian plasmas at next-to-leading order

Wednesday, 6 April 2022 09:20 (20 minutes)

The far-from-equilibrium non-abelian plasma is created in the early stage of heavy-ion collision. The “bottom-up” mechanism is the well-studied phenomenological description of its approaching to thermal equilibrium, but has been restricted to leading order coupling within kinetic theory calculation. In our recent work, we provide a next-to-leading-order (NLO) weak-coupling description of the thermalization process of far-from-equilibrium non-abelian plasmas. Starting from either over- or under-occupied initial conditions, we follow their time evolution towards thermal equilibrium by numerically solving the QCD effective kinetic equation at NLO accuracy for isotropic non-abelian plasmas. It turns out that the NLO corrections remain well under control for a wide range of couplings and that the overall effect of NLO corrections is to reduce the time needed to reach thermal equilibrium in the systems considered.

Reference: arXiv:2110.01540 [hep-ph]

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Session Classification: Parallel Session T01: Initial state physics and approach to thermal equilibrium

Track Classification: Initial state physics and approach to thermal equilibrium