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Light and strange quark chemical equilibration of the quark-gluon plasma

We perform a phenomenological study of chemical equilibration using viscous hydrodynamic evolution with an equation of state that parameterize gluon-quark chemical equilibrium through fugacities for each quark flavor. We initialize the QCD medium in a gluon-dominated state and account dynamically for chemical equilibration during the hydrodynamic phase through time-dependent fugacities. We present results from complete heavy-ion collision simulations using this model, showing that hadronic and electromagnetic observables are sensitive to quark equilibration times. We examine the effects of strange flavor equilibration on strange hadron production and explore the impact of quark chemical equilibration on QGP transport properties. Additionally, we present preliminary results from a Bayesian model-to-data comparison aimed at simultaneously constraining equilibration times and transport coefficients of the QGP.

Category

Theory

Collaboration (if applicable)

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