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Typ: Talk

Dilepton spectra as probes of the early stages of heavy-ion collisions

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The early stages of heavy-ion collisions are largely unexplored experimentally, despite great theory progresses. In such collisions, electromagnetic radiation such as dileptons are produced throughout the history of the medium and probe its quark content. Hence, they are useful tools to investigate the early stages of the quark-gluon plasma, allowing to better understand its chemical and kinetic equilibration. The measurement of such observable is challenging; in particular, one important source of background is the Drell-Yan production of dileptons in the initial hard scatterings. In this contribution we present our estimate of the dilepton spectrum produced by the quark-gluon plasma starting from the early stages, in the intermediate mass range $1 < M < 5 \text{ GeV}/c^2$, based on QCD kinetic theory. We also estimate the Drell-Yan background in this kinematic range using a state-of-the-art perturbative computation. Our calculation takes into account the anisotropy of the quark and gluon momentum distributions at early times, as well as the under-population of quarks relative to gluons. We investigate different characteristics of this spectrum, in particular its sensitivity to the equilibration time of the quark-gluon plasma, and its approximate scaling with transverse mass. Finally we investigate to what extent can the polarization of dilepton pairs provide a handle to separate the Drell Yan contribution from later dilepton production.

Experiment/Theory

Theory/Phenomenology

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