Contribution ID: **174**   Type: **Oral presentation**

Scaling of pre-equilibrium dilepton production in QCD Kinetic Theory

Tuesday, 24 September 2024 09:00 (20 minutes)

The idea of using dilepton measurements to construct a phenomenology of the early pre-equilibrium phase of heavy-ion collisions has been recently posed [1,2]. Nevertheless, a full computation of pre-equilibrium radiation yields was still missing. In this work, we use QCD kinetic theory to compute dilepton production coming from the pre equilibrium phase of the Quark-Gluon Plasma created in high-energy heavy-ion collisions [3]. Additionally, we demonstrate that the dilepton spectrum exhibits a simple scaling in terms of the specific shear viscosity η/s and entropy density $dS/d\zeta \sim (T\tau^{1/3})_{\infty}^{3/2}$, which can be derived from dimensional analysis in the presence of a pre-equilibrium attractor. Based on this scaling we present a useful scaling formula readily available for phenomenology. We then perform full event-by-event calculations of in-medium dilepton production. By comparison to thermal QGP radiation, as well as the Drell-Yan background [4], we determine the invariant mass range where the pre-equilibrium yield is the leading contribution.

References:

[1] M. Coquet, X. Du, J.-Y. Ollitrault, S. Schlichting, and M. Winn, Phys.Lett.B 821 (2021) 136626, arXiv: [2309.00555]

[2] F. Seck, B. Friman, T. Galatyuk, H. van Hees, E. Speranza, R. Rapp, and J. Wambach, arXiv: [2309.03189]

[3] O. Garcia-Montero , P. Plaschke, S. Schlichting, arXiv: [2403.04846]

[4] S. D. Drell and T.-M. Yan, Phys. Rev. Lett. 25, 316 (1970)

Category

Theory

Collaboration

Primary authors: GARCIA MONTERO, Oscar Jesús; PLASCHKE, Philip (Bielefeld University); Prof. SCHLICHT-ING, Soeren (Universität Bielefeld)

Presenter: GARCIA MONTERO, Oscar Jesús

Session Classification: Parallel Session 12

Track Classification: 4. Electromagnetic and electroweak probes