

The 149th HENPIC seminar by Dr. Xiaojian Du (Bielefeld University), Sep. 23, 2021, Thursday, 2:00pm (Beijing time)

Talk title: Pre-equilibrium QCD plasma in heavy-ion collisions

Abstract: Non-equilibrium systems are omnipresent in nature. QCD plasma out of equilibrium and its equilibration are of particular interest giving that the relativistic heavy-ion collisions (HICs) produce the non-equilibrium quark-gluon plasma (QGP) which eventually emerges to thermal hydrodynamic states. We investigate the kinetic and chemical equilibration of weakly coupled QCD plasma at finite density with a numerical implementation of QCD effective kinetic theory based on leading-order QCD, revealing the relevant equilibration pattern and turbulent nature of the QCD plasma far from equilibrium. We then show the QGP equilibration in HICs as a universal attractor towards hydrodynamics. Based on that, some phenomenological applications of the attractor in HICs are discussed.

[1] X. Du, S. Schlichting, Phys. Rev. Lett. 127, 122301 (2021) arXiv:2012.09068

[2] X. Du, S. Schlichting, Phys. Rev. D 104, 054011 (2021) arXiv:2012.09079

[3] M. Coquet, X. Du, JY Ollitrault, S. Schlichting, M. Winn, Phys. Lett. B 821 (2021) 136626, arXiv:2104.07622

About the speaker: Xiaojian Du is a postdoc researcher at Bielefeld University. He works on theoretical study and numerical simulation of non-equilibrium quark-gluon plasma and its application in heavy-ion collisions. Before that, he obtained his Ph.D. from Texas A&M University working on quarkonium production from kinetic theory simulation and its phenomenology in heavy-ion collisions.