

Quark-Gluon Plasma properties deduced from particle-correlation measurements at the LHC

Dr. Jan Fiete Grosse-Oetringhaus
CERN (Schweiz)

With the start-up of the Large Hadron Collider, heavy-ion physics has entered a precision era, where the properties of the Quark-Gluon plasma produced in ultrarelativistic Pb-Pb collisions can be studied in great detail.

Particle correlations are a powerful tool to learn about the dynamics of the produced plasma. On the one hand, particle correlations in the low to intermediate momentum region assess the medium evolution which allows one to learn about the initial state of the collision as well as about hydrodynamic properties of the plasma, for example its viscosity. On the other hand, particle correlations in the intermediate to high momentum region probe effects of the plasma on high momentum partons (jet quenching) giving insight into jet-medium interactions.

Furthermore, particle correlations have revealed that collective-like effects are also present in small systems like p-Pb and pp collisions.

The study of the system size dependence of these effects provides strong constraints on hydrodynamic modeling.

The talk will review particle-correlation techniques and discuss recent measurements and their interpretations. An outlook for their future potential is given.