Contribution ID: 11

Gravitational shock wave collision and matter equilibration in heavy ion collisions

Successful applications of hydrodynamical simulation implies an early thermalization time of quark gluon plasma produced in heavy ion collisions. This suggests the quark gluon plasma is strongly coupled. Theoretical understanding of the equilibration of the strongly coupled matter remains an open problem. In this talk, we will study the matter equilibration in heavy ion collisions with holographic method. The relativistic nucleus are modelled by gravitational shock waves. We constructed the trapped surface associated with the collision of two shock waves. The area of the trapped surface gives a lower bound of the entropy production in heavy ion collisions. We will study the centrality dependence of the entropy production, and show the existence of critical impact parameter, beyond which thermalization is not possible. We will also comment on the applicability of different types of shock waves in modelling the real world nucleus.

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