

Energy dependence of energy loss in Au+Au collisions at PHENIX

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The suppression of inclusive pion production by up to a factor of 5, which was first observed in Au + Au at $\sqrt{s_{NN}} = 130$ GeV/c (e.g. [1]) and later in Au + Au at $\sqrt{s_{NN}} = 200$ GeV/c [2, 3], is one of the most significant manifestations of the opaque QGP produced in heavy ion collisions. The absence of this suppression in d + Au collisions at the same energy indicates the final state nature of the suppression. It is natural to ask where the onset of such massive suppression is in terms of the energy density of the medium which is dictated by the collision energy, centrality and the mass of colliding nuclei. The PHENIX collaboration has studied collisions of lighter nuclei (Cu + Cu) at different beam energies in 2005 [4]. While a significant suppression is observed both at $\sqrt{s_{NN}} = 200$ and 62.4 GeV, at $\sqrt{s_{NN}} = 22.4$ GeV a moderate enhancement is found. In 2010 RHIC scanned lower energies, and PHENIX collected substantial data sets in Au + Au collisions at $\sqrt{s_{NN}} = 39$ and 62 GeV. The goal was to identify better the conditions for the onset of the π^0 suppression. This talk presents results from the systematic study of c.m. energy and the system size dependencies of π^0 yield and the nuclear modification factor.

References

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