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Inverse slope of the photon p_T spectrum and the QGP temperature profile

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Thermal photon emission from the QGP is visible in the p_T spectrum of direct photons measured in heavy-ion collisions, producing a characteristic exponential dependence of the spectrum at low p_T . The ALICE, PHENIX and STAR Collaboration have quantified this inverse slope T_{eff} , measuring ≈ 200 -400 MeV, close to the range of QGP temperatures seen in hydrodynamic simulations of the plasma.

I will first present a simplified model of heavy-ion collisions in which a well-defined temperature profile of the plasma can be related to the inverse slope of the photon spectrum, providing a connection between the spectrum's inverse slope T_{eff} , the QGP's size and *maximum* temperature, as well as the range of p_T used to determine T_{eff} from the photon spectrum. I will compare these results with existing and new numerical simulations, discussing the role of the plasma's transverse expansion on T_{eff} , distinguishing between the initial transverse flow and the radial flow developed from the plasma's expansion.

Category

Theory

Collaboration (if applicable)

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