Measurements of thermal dielectron production in isobar collisions at $\sqrt{s_{\rm NN}} = 200$ GeV with STAR

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Abstract

Lattice QCD predicts a phase transition from hadronic matter to the Quark-Gluon Plasma (QGP) at high temperature and low baryon chemical potential. The QGP can be created in relativistic heavy-ion collisions, where dileptons are produced throughout the entire evolution and do not involve strong interactions. As a result, they carry original information about their emission source, and are therefore suggested as the ideal probes of hot and dense medium properties. In particular, the invariant mass distribution of thermal dielectrons is not subjected to blue-shift effects, which enables the extraction of the average temperature of the hot QCD medium at different stages of the evolution.

In this poster, we report the measurements of the thermal dielectron production in Ru+Ru and Zr+Zr collisions at $\sqrt{s_{\rm NN}} = 200$ GeV with the STAR experiment. The invariant mass and transverse momentum spectra of the thermal dielectrons will be compared with theoretical calculations. The average temperature extracted from thermal dielectrons in the low-mass and intermediate-mass regions will be presented as a function of baryon chemical potential and compared with those from other collision energies and systems. These measurements will shed new light on the understanding of the QGP evolution and the in-medium properties of the ρ meson.