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Dilepton production in p+p, Au+Au collisions at $\sqrt{s_{NN}}$=200 GeV and U+U collisions at $\sqrt{s_{NN}}$=193 GeV

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Dileptons (l^+l^-) are produced throughout all stages of heavy-ion collisions and escape with minimum interaction with the strongly interacting medium. For this reason, l^+l^- pair measurements play an essential role in the study of the hot and dense nuclear matter created in heavy-ion collisions. Dileptons in the low invariant mass region (up to M_{ll} ~1~GeV/c^2) retain information about the in-medium modification of vector mesons while dileptons in the intermediate mass region (extending out to M_{ll} ~3 GeV/c^2) predominantly originate from charm decays and thermal radiation of the medium. At higher invariant masses, recent studies of J/ψ yields in peripheral A+A collisions by the ALICE~\cite{alice} and STAR collaborations showed significant excess at very low momentum transfers (p_T < 0.3~GeV/c). These observations may point to evidence of coherent photoproduction of J/ψ in hadronic interactions which conflicts with traditional knowledge of the coherent photoproduction mechanism. It is interesting to investigate the e^+e^- pair production in a wider invariant mass region (M_{ee} <4 GeV/c^2) at very low p_T in heavy-ion collisions for different centrality bins in order to study the production mechanism.

This talk will cover e^+e^- spectra with various invariant mass and p_T differentials in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV and U+U collisions at $\sqrt{s_{NN}}$ = 193 GeV. The structure of the t (t = p_T^2) distributions of these mass regions will be shown and compared with the same distributions in ultra-peripheral collisions. Additionally, this talk will cover first measurements of $\mu^+\mu^-$ invariant mass spectra from STAR's recently installed Muon Telescope Detector (MTD) in p+p and Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV. Physics implications of the $\mu^+\mu^-$ results will be discussed in the context of STAR's published e^+e^- results.

Preferred Track

Electromagnetic Probes

Collaboration

STAR

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