

Coherent very low transverse momentum e^+e^- production in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV and U+U collisions at $\sqrt{s_{NN}} = 193$ GeV at STAR

Summary

Recent ALICE collaboration measurements showed a significant excess in J/ψ yield in the very low transverse momenta ($p_T < 0.3$ GeV/c) in peripheral Pb+Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV. The same behavior of the J/ψ production is observed at STAR in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV. These results are interpreted as coherent photoproduction of J/ψ at the moment. The coherent photonproduction scenario may also suggest there is an excess of photoproduced electron-positron production at the very low p_T in peripheral collisions. It would be very interesting to investigate the electron-positron pair production in the full mass region ($M_{ee} < 4\text{GeV}/c^2$) at very low p_T in heavy-ion collisions in different centrality bins. If the coherent photoproduction mechanism confirmed, the coherently photoproduced e^+e^- pairs accompanying violent hadronic collisions may provide a novel probe of the hot and dense nuclear matter.

In this talk, we will present e^+e^- invariant mass spectra in very low p_T in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV and U+U collisions at $\sqrt{s_{NN}} = 193$ GeV. The p_T spectra from different mass regions (0.4-0.76, 1.2-2.6, and 2.8-3.2 GeV/ c^2) will be reported. The structure of t ($t = p_T^2$) distributions of these mass regions and comparisons with that in ultra-peripheral collisions will be shown. The centrality dependence of the e^+e^- productions will be shown. Physics messages will be discussed.

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