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Initial electromagnetic field dependence of photon-induced production in isobaric collisions at STAR

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The Lorentz-boosted electromagnetic field, arising from colliding nuclei, can be treated as a flux of quasi-real photons. Consequent photonuclear ($\propto Z^2$) and photon-photon ($\propto Z^4$) processes could reasonably explain the observed enhancements of J/ψ and e^+e^- pair production at very low transverse momenta (p_T) in peripheral heavy-ion collisions. The STAR experiment collected datasets of $^{96}_{44}$Ru+$^{96}_{44}$Ru and $^{96}_{40}$Zr+$^{96}_{40}$Zr collisions at $\sqrt{s_{\rm NN}}$ = 200 GeV in 2018, which provide a unique opportunity to study the field strength dependence of photon-induced processes.

In this presentation, we will present measurements of J/ψ and e^+e^- pair production at very low p_T in peripheral and ultra-peripheral isobaric collisions, and study the electromagnetic field dependence of photon-induced production by comparing measurements between isobaric and Au+Au collisions. Physics implications of these results will be discussed together with model comparisons.

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