

# Angular modulation of photon-induced $J/\psi$ and lepton pair production in heavy ion collisions at STAR

*Tuesday, 12 December 2023 10:00 (15 minutes)*

Ultra-strong electromagnetic field in relativistic heavy-ion collisions can generate a large flux of linearly polarized quasi-real photons. Photons emitted by one nucleus can interact with the other whole nucleus or individual nucleons to produce vector meson ( $\gamma + A \rightarrow V + A$ ). On the other hand, interactions between photons emitted by two nuclei can produce lepton pairs ( $\gamma + \gamma \rightarrow l^+ + l^-$ ). Notably, azimuthal asymmetries between the pair momentum and the daughter momentum could arise from the linear polarization of incident photons. The photon-induced vector mesons and lepton pairs carry information about the original electromagnetic field, which provides a sensitive probe to study the polarization dependent effects predicted by spin interference and QED vacuum birefringence.

In this presentation, we will report the angular modulation measurements of the photon-induced  $J/\psi$  and  $e^+e^-$  pair production in Ru+Ru, Zr+Zr and Au+Au peripheral and ultra-peripheral collisions at  $\sqrt{s_{NN}} = 200$  GeV. The angular modulation of  $\mu^+\mu^-$  pairs in Au+Au peripheral collisions will also be presented. Physics implications of these results will be discussed together with model comparisons.

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**Session Classification:** Vector meson photoproduction

**Track Classification:** Session 1: Vector meson photoproduction