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Low- p_T e^+e^- pair production in Au+Au collisions and exclusive J/ψ production in d+Au collisions at STAR

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In ultrarelativistic heavy-ion collisions, strong electromagnetic fields arising from the Lorentz-contraction of highly charged nuclei generate a large flux of quasi-real photons. STAR measurements of the Breit-Wheeler photon-photon fusion process in Ultra-Peripheral Collisions (UPC) have recently demonstrated that the colliding photons are linearly polarized and that the linear polarization leads to azimuthal angle modulations in the final state particle distribution. Similar measurements in peripheral collisions provide an opportunity to directly test the energy and impact parameter dependence of this newly observed phenomenon of QED.

It has been recently suggested that exclusive photo-nuclear J/ψ production in electron-deuteron scattering at the Electron-Ion Collider (EIC) would provide new insights into the Short-Range Correlations inside nuclei, particularly from the perspective of the underlying quark-gluon dynamics. While awaiting for EIC, data from deuteron-gold (d+Au) UPCs recorded by the STAR detector at the Relativistic Heavy Ion Collider can be used as a proxy to test various techniques and hypotheses.

In this presentation, we will present measurements of the $\gamma\gamma \rightarrow e^+e^-$ process at low transverse momentum in peripheral (80-100%) Au+Au collisions and exclusive J/ψ photo-production measurements in ultraperipheral d+Au collisions. The implications of the related results will also be discussed.

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