

The measurement of Drell-Söding process through exclusive $\pi^+\pi^-$ pair photoproduction in ultraperipheral Au+Au collisions at 200 GeV

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The Drell-Söding process, non-resonance pair production through photon-nuclear interaction plays a vital role in the exclusive $\pi^+\pi^-$ pair mass profile description. Among the products of photon-nuclear interactions, the continuum $\pi^+\pi^-$ pairs are directly produced in addition to decays of photoproduced ρ^0 . Previous measurements and the widely utilized Monte Carlo model (STARlight) have treated the non-resonance $\pi^+\pi^-$ production as invariant across the ρ^0 mass region, with corrections applied generally independent on the transverse momenta of $\pi^+\pi^-$ pairs. Leveraging theoretical model calculations, we have identified the mass slope in the ρ^0 mass region for the Drell-Söding process, and measured the differential cross-section of this process as a function of p_T , rapidity and mass. This novel approach not only refines our understanding of the underlying dynamics of photon nuclear scattering but also serves as another probe for the nuclear profile.

In this talk, we will present the first measurement of the Drell-Söding process in ultra-peripheral Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV from the STAR experiment. We will report the measurement of the interference angular modulation and the t spectrum of the Drell-Söding $\pi^+\pi^-$ production. We will discuss the implications of mass and lifetime of a virtual particle anti-particle pair, fluctuated from a photon in the photon nuclear interactions.

Category

Experiment

Collaboration

STAR

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