

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

Xinbai Li (for the STAR Collaboration)
University of Science and Technology of China

Abstract

1 The Drell-Söding process, non-resonance pair production through photon-nuclear
2 interaction plays a vital role in the exclusive $\pi^+\pi^-$ pair mass profile description.
3 Among the products of photon-nuclear interactions, the continuum $\pi^+\pi^-$ pairs
4 are directly produced in addition to decays of photoproduced ρ^0 , equivalent to
5 no lifetime. Previous measurements and the widely utilized Monte Carlo model
6 (STARlight) have treated the non-resonance $\pi^+\pi^-$ production as invariant across
7 the ρ^0 mass region, with corrections applied generally independent on the trans-
8 verse momenta of $\pi^+\pi^-$ pairs. Leveraging the validated theoretical model calcula-
9 tions, we have identified the mass slope in the ρ^0 mass region for the Drell-Söding
10 process. We measured the differential cross-section of the Drell-Söding process as
11 a function of p_T , rapidity and mass. This novel approach not only refines our
12 understanding of the underlying dynamics of photon nuclear scattering but also
13 serves as another probe for the nuclear profile.

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