Diffractive photo-nuclear production of ρ^0 mesons in peripheral Au+Au collisions at STAR

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Highly Lorentz-contracted electromagnetic fields from fast-moving nuclei can be quantized as linearly polarized quasi-real photons from one nucleus which scatter coherently off of a target nucleus, making vector mesons. This diffractive interaction creates vector mesons which are (like their parent photon) polarized along the direction of the field, radially away from the nucleus. Coherently produced vector mesons have been previously measured in p+p and ultra-peripheral A+A (UPCs) collisions. Such ρ^0 in UPCs exhibit quantum interference between the wave functions of the ρ^0 from either nuclei. Recent analysis demonstrates this effect in UPCs directly by looking at the angular distribution of their daughter pions. In this analysis we present a complementary measurement by looking for the same photoproduction and quantum interference in 200 GeV peripheral Au+Au collisions at STAR. It is not known to what degree (if at all) the quantum interference might survive the medium of hadronic interactions present in an Au+Au collision. By looking at such interference we can test the limits of what is meant by 'coherent' in the diffractive process.