

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

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5 Highly Lorentz-contracted electromagnetic fields from fast-moving nuclei can
6 be quantized as linearly polarized quasi-real photons. Photons from one nucleus
7 may scatter coherently off of the other nucleus, and produce vector mesons, such
8 as ρ^0 . This diffractive interaction creates vector mesons which are (like their
9 parent photon) polarized along the direction of the field and radially away from
10 the nucleus. Coherently produced vector mesons have been previously mea-
11 sured in p+p and Ultra-Peripheral A+A Collisions (UPCs). The ρ^0 in UPCs is
12 expected to exhibit quantum interference between the wave functions of the ρ^0
13 from either nucleus. A recent measurement demonstrates this effect in UPCs
14 directly by measuring the angular distribution of the daughter pions. In this
15 talk, we present a complementary measurement by looking for the same pho-
16 toproduction and quantum interference of ρ^0 mesons in 200 GeV peripheral
17 Au+Au collisions at STAR. It is not known to what degree (if at all) the quan-
18 tum interference might survive the hadronic interactions occurring concurrently
19 in the same Au+Au collision. By measuring such an interference in peripheral
20 Au+Au collisions, one can test the limits of the “coherence” of the diffractive
21 process.