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ρ^0 photoproduction and the Q^2 evolution of the shape of gold nuclei

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Coherent photoproduction of vector mesons is sensitive to the shape of the target nucleus, as probed at $Q^2 \sim (M_V/2)^2$. Previously STAR presented a high-statistics measurement of $d\sigma/dt$ for ρ^0 photoproduction in ultra-peripheral Au+Au collisions, and made a two-dimensional Fourier-Bessel (Hanckel) transformation to give the distribution of targets in the nucleus. Here, we study the Q^2 evolution of $d\sigma/dt$ and the target distribution by dividing the ρ^0 signal into three different mass bins, to see how $d\sigma/dt$ evolves with Q^2 , and see the effect on the target distribution. With increasing Q^2 , we expect to see a decrease in multiple interactions, which should emphasize the interior of the nucleus compared to measurements at lower Q^2 .

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