Using coherent dipion photoproduction to image gold nuclei

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High-energy coherent photoproduction can be used to image the transverse position of gluons in heavy nuclei (similar to the Generalized Parton Distribution, but for nuclei). The two-dimensional Fourier transform of dsigma/dt gives the transverse distribution of interaction sites in the nuclei; for photoproduction, this probes the gluon distributions. However, there are many systematic effects that are present in real data. We will report on a study of dipion photoproduction using 636,000 photoproduced pion pairs in ultra-peripheral collisions, as observed by the STAR detector. We will emphasize the systematic uncertainties, due to the need to subtract the incoherent photoproduction background, the limited accessible t range and the uncertainties in the photon transverse momentum spectrum. Many of these uncertainties will also be present at the future electron-ion collider, and we will discuss the prospects for imaging measurements there.